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Utilizing memory styles in learning - how to learn a piece by heart

Learning styles, practice, and reflection

Written reflection within degree project
The sounding part of the project is the following recording:

Katariina Kolehmainen - Zoltán Kodály sonata for unaccompanied cello, Op. 8 (exam concert)
Abstract

The process of memorization of musical pieces and performing without the support of sheet music is often described as ”playing a piece by heart.” This thesis delves into the process of memorization in classical music, with a particular focus on the author's personal journey in practicing the Kodaly’s solo cello sonata, highlighting the utilization of four distinct memory styles: kinesthetic, aural, visual, and analytical memory. Through an examination of each memory style, this study unravels the multifaceted nature of memorization in musical performance. The thesis not only explores the individual contributions of these memory styles but also examines how to combine them during the learning and memorization process. Through examples, the author sheds light on how she integrated these memory styles, achieving a comprehensive understanding of the piece and ultimately being able to perform it by heart. The findings of this study contribute to the broader field of music cognition, providing valuable insights into the mechanisms involved in memorization and performance. It highlights the importance of considering diverse memory styles and their integration in learning effective memorization techniques in classical music. This study can be useful for musicians who want to develop their memorization process and have a good experience from learning and performing pieces by heart.

Keywords: Memorization, Playing by Heart, Memory Styles, Aural Memory, Kinesthetic Memory, Analytical Memory, Visual Memory
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Introduction

I knew from the start, that when I decided to learn this massive solo piece by Kodaly, I needed to combine different learning styles and memorization techniques. As musicians, we all know the concept of muscle memory, but it was clear to me, when facing this big of a challenge, it wouldn't be enough.

I’ve always been a fast learner when it comes to playing by heart. My strength has been my aural memory, the ability to learn by ear. But in some performances, I have had scary moments of memory slips and the split second of horror when my concentration dozes off. I didn’t want that to be a part of my master’s exam concert. To feel more secure about the performance I had to incorporate more conscious thinking into my learning and internalize the different learning styles.

So how could one enhance their memorizing process and how does it eventually turn into musical expression? How can it be done more efficiently and easier without just relying on muscle memory? So, I had to learn how to learn to play a piece by heart.

As Winslow (1949) stated in his research ”To recall and retain the music without stimulus from the printed page one must see it in the mind's eye, hear it, and feel it throughout the neuro-muscular system. This process is obviously a voluntary one and basically dependent upon the will, desire, and intent to memorize.” These things Winslow is referring to are recognized as visual, aural, and kinesthetic memory styles, respectively. Combining these with analytical memory style (Dickinson 2009) we have a combined multi-level approach to memorization process.
Memory styles

Kinesthetic memory

Kinesthetic memory, also known as muscle memory, is the most used memorization technique, even without the goal of playing by heart. As Bricard et al. (1978) write in their work, muscle memory represents controlled, coordinated neuromuscular responses to different auditory, visual, and intellectual stimuli. Muscle memory is the groundwork on which analytical and aural memory are built upon, allowing for more nuances and dynamics to be implemented into ones playing later on. It’s the work we as musicians do every day to learn music and develop our skills playing the instrument. Its objective is to develop muscle coordination to a point where playing is almost automated and reflexive regardless of the players conscious effort (Bricard et al. 1978).

One good way to establish a solid foundation to muscle memory is to practice the material slowly. This allows the player to make space for cognitive attention to put focus on details deserving more concentration (Mishra 2004). As string players, we need to make sure that the fingerings and bowings are exactly the same every time. If the player plays the same passage with ten different combinations of bowings and fingerings, it is nearly impossible to establish a coherent muscle memory that would produce the same mechanical outcome every time. Or as Bricard et al (1978) said ”It is far more efficient to learn once rather than to have to unlearn and relearn again.”

Aural memory

The role of the aural memory is to act like a safety net, on which a performer can rely during the performance. Aural memory provides a baseline to the performer to which they can compare their playing to and adjust their moment to moment playing to match the aural memory. Aural memory must be practiced as well. How to better memorize each note, passage, and dynamic changes in a long piece is not an easy task. Therefore, actively listening to
yourself and learning by heart, just to recall how a piece should sound is crucial. If you are unsure of how the notes fall into place auditivey, you have no reference point and you are set up for failure.

Aural overview is formed and achieved through repetition. In their work, Mishra et al (2004) described aural learners tending to preview pieces by listening, forming overall images of tempo variances, difficult passages, and auditory patterns. According to Mishra et al (2004) it is easier for aural learners to understand the variations in the melody while listening to the piece.

Aural memory does not just mean that one must listen to recordings or other people’s playing to get the sounding image in their heads. It consists also of active listening to one’s own playing. While listening and recalling your own playing without the instrument, you’re not limited by the technical muscle memory that you might not have established yet properly. Also singing the piece in one’s mind allows the player to picture the music without the instrument’s and player’s own limitations. Singing helps the aural memory to process the information and memorize it better. One must have a keen ear to the quality of the sound and intonation at all times. It’s much more effective to practice something with an idea of the final sounding image in mind.

**Visual memory**

Mishra (2004) states that ”visual memory is the ability to recall a mental picture of musical notation, as a whole or in parts, or visualize finger patterns or hand positions on an instrument.” While visualizing finger patterns and individual notes might be easier on the piano, visual learning whilst playing a cello is not the same thing. Cellists cannot efficiently enhance their visual memory by looking at their hands, because that is not the recommended way to play the cello. While playing the piano, the player can visualize every note and see if there is a pattern on the chords, in the melody or even in their own hand movement. Every key on a piano has a determined note assigned to it,
whereas notes on the cello are not visualized apart from the open strings. Therefore, visual memory is used mainly on sheet music. Also, the key to this technique is to always repeat the intended sign written while practicing to avoid confusion in the coordination of both hands.

Noticing highlighted sections in the music while practicing, the information will be memorized better. Examples of this can be fingerings, bowings, forward or backward arrows for phrasing guidance, markings highlighting the dynamic changes and other visual cues. As the cellist T. Lisboa was practicing and performing the 6th suite by Bach, she had many visual cues embedded into the notation (Chaffin et al 2009). She for example circled an up-bow crescendo in to the music, to help her keep the two passages straight as she played from memory.

**Analytical memory**

The basis for analytical approach comes from the players own whole history and background with music. To be able to analyze music at a certain level requires the ability to understand the structure and form of the piece, and basic principles of music. Such as, for example, the knowledge of a basic sonata form or more simple things like scales or chords etc. Main goal of the analytical memory style is to form a mental or visual representation of the form, harmony, and texture of the piece in question (Mishra 2004).

It starts from the moment the player opens the music and begins to conceptualize the written information. Or the analytical process can begin with the player just listening to the piece and trying to make sense of it aurally, with or without the sheet music in front of them. Committing the piece to memory, the attention of the player shifts from note-to-note remembrance and opens up to the broad interpretation of the piece’s elements, such as phrases and tempi (Bricard et al 1978).
It is more common for inexperienced musicians to not dwell as deep into analytical strategies of memorization as experts and more advanced players (Hallam 1997). As long as the player understands and can interpret their own analysis of the piece, however flawed in theoretical terminology it might be, it will most likely benefit the memorization process. A musical analysis doesn’t necessarily require mastery of music theory and history; even a flawed analysis carries much more intrinsic value to the player as they form a scheme of the music in their own musical language. In its most basic form, for example, this can be expressed as music shifting into minor key, is interpreted as ”melancholic” by the player.

By using these memory styles as a framework to better understand how to enhance my own memorization process, I will be reflecting on my journey to learning Kodaly’s solo cello sonata Op. 8.

**Study of learning a piece by heart**

The aim of this work is to present my observations and experience with the memorization tools I used in learning and performing Zoltán Kodály’s Sonata for Unaccompanied Cello, Op. 8 by heart for my master exam concert 31.5.2021.

**Listening and learning**

I’ve always considered myself as a fast learner by ear. But this piece is filled with different left hand and right-hand techniques and is not the easiest classical music to comprehend. Sometimes I wondered, is that the reason why I could recall the melodies and patterns quickly by ear, because they were a bit ”weird” and unusual to anything I’ve ever played before. That being said, I knew, with this piece, that would not be enough for me to have a secure memory of the whole piece. If something were to happen, a momentary lapse
of concentration perhaps, would my aural memory be enough to get me through the panic?

I started with one of the easiest tools there are; listening to different kinds of recordings. Because I didn’t want to be too influenced by just one player’s interpretation, I tried to make sure my list of references consisted of recordings from different time periods, different cellists, live and studio recordings, students and professionals. I quickly found hundreds of recordings, both from Spotify and YouTube, all the way from the 60s to the present day.

There are benefits and drawbacks with memorization process using recordings. There is a chance that one’s own personal interpretation will be too influenced by other performers and their musical choices. If one decides to do the same things the other player did, that’s fine, but then one must have made that choice consciously. You can get ideas and more colors into your palette so to speak, but in the end, you still want it to sound like you would play it, not to copy anyone. You can get many different points of views to the sound or to a passage through recordings because every player is different. Listening can give ideas how to phrase the music yourself, and different approaches will feed your imagination. For example, watching videos from YouTube I could see closeups from the players hands. I could then slow the video down just to see what fingerings or bowings they were using and then I’d test them myself and try to feel if they worked for me.

I find that, especially in this kind of piece with a scordatura tuning, it’s sometimes hard to read the music and find the right notes. Scordatura in this piece means that the two lowest strings, G and C, are both tuned a semitone down to F# and H, but the notation stays the same as it would be played with the original tuning of the cello. And the higher they go up in the notation, the harder it gets for me to read them. For those parts I needed to memorize the passage in my ears first, so I could find the notes easier on the fingerboard.
For example, this next section in the second movement (Figure 1).

![Figure 1](image.png)

Figure 1 A passage in the second movement highlighting the melody in green starting from the third bar in the example.

Starting from the third bar of the example, the melody is supposed to be played all the way on the G-string. And for me it was difficult to find the right pitch so high up the string without the sounding image in mind. With normal tuning, I usually play the same note, for example the first D in the fifth bar, on the A-string to get the right pitch in my ear. But with this tuning it started to become too messy for my brain. I listened to this part on repeat from a record, sang it many times and then played it on my cello. One useful tool I also used when things started to become harder for my eyes, I played the passages on a piano. I tried to shift my brain from always thinking from a cello’s perspective, towards thinking how the music itself would sound.

**Getting to know the piece through music analysis**

While this is a good strategy for some, I wasn’t at the time as familiar with the theoretical background of music analysis. Therefore, as it would have consumed too much time from actually learning the piece, I started with the aural learning instead. Although I did use the notation in front of me while actively listening for harmonic patterns and structure, to form an aural image of the music’s form. This is an example of combining two different memory styles, analytical and aural, together. The purpose of looking into the score while listening is not only to find and analyze the form but to also nourish my musical imagination. I read the score, without the audio support and with it. I made notes and used color pencils to highlight interesting details to bring out the visual aspect. To make practicing easier, I divided the movements into
smaller sections for easier comprehension instead of just looking at the big picture.

Usually with music analysis, it helps me to write in chords and their progression, to find out where the phrase is going. For example, if I play Bach’s cello suites, I tend to write the chords out to form a musical path so to speak. But with this piece, I could not do that, because I didn’t know how, and it would not have helped me at all.

If I play something like a sonata with a piano or an orchestral piece, I want to know what the context of the music is and if there’s history or a story behind it. It helps the memorizing process when I know my role in the music. This piece is heavily influenced by Hungarian folk music, especially the whole third movement. This movement is maybe the hardest piece of music that I’ve ever played in my life, so it was a good reminder for me to try to always have the virtuosity of folk music in mind instead of getting stuck on just how hard this piece was to play technically.

**The power of imagination in learning**

For me this is the most fun part. My imagination allows me to bring depth into my playing and in the best scenario I would be able to conjure these mental images through my playing also to the listener.

I started to make up characters and moods in different sections of the music. I would begin to wonder; would this be a person who is seeking something. Or maybe they are singing to someone. Could it be an animal instead of a person? Where would it or they be? Maybe in a misty forest or in a brutalist concrete building? So much more fun playing something if I have a story, or some kind of a mental image in mind. I tried to see if these images helped or benefitted me somehow with the interpretation. Obviously, I cannot actively think of all these details as I’m playing, but in the process of learning they give me a lot of ideas and ways to interpret the music. It’s also a mental
practice tool for me to try to visualize the whole journey of the music in my head.

For example, after the fast aggressive passage in the middle of the second movement, my teacher brought up a character from the Asterix comic books. The man is a Corsican battle commander, and he has a deathly stare and a very demanding posture if people don’t agree with him. Remembering this very distinctive character, I’m able to recall the exact feeling I’m supposed to be channeling in that specific passage. Stories like this help me to visualize the music and memorize it faster in the learning process.

**Kinesthetic memory – the groundwork**

Basically, it is like this: kinesthetic memory = practice. Especially with hard pieces like this one, really the biggest part of the work is just sitting in a room and practicing. The music is filled with different information and extensive challenging techniques, so I had to make sure that it needs to be slowly driven into my muscle memory before even trying to learn it by heart.

Before I started to actually play the piece, I tried to have a sort of internalized idea of the music, its style and form in my head. This way, I could try to practice with a conscious mind and not learn anything “wrong” or in vain. I started to divide the movements into smaller sections and slow down the tempo. If I couldn’t figure out any good bowings, I asked my teachers for advice. I watched different YouTube videos of certain places, to try to find different ideas of bowings and fingerings before I made up my own that could work for me and my interpretation.

I’ve recognized that the slower the tempo of the music is, the harder it is for me to remember. An example of such a slow and long passage can be found in the beginning of the second movement (Figure 2). Once at a lesson with a Swedish cellist, Jacob Koranyi, he told me to try to play the whole passage in a double or triple tempo. This method allowed me to grasp the composer’s
idea of the phrase, and then how to phrase it myself and bring it down to the intended tempo. So here I combined the kinesthetic memory with the aural memory.

Visualizing the music

For me personally, visual memorization is not the most effective one, although I use it regularly. Even without the goal of playing by memory, string players write bowings and fingerings into the music. One way to utilize visual memory tools, is to use color pencils to outline certain information. For example, for a piece that has a lot of fast changes in dynamics, I have felt that if I color all the piano dynamics in blue and all the fortés in red, they really stick out. It’s necessary for me to sometimes write in the exact fingerings I’m about to use, so that I will not accidentally play with different fingerings. This is one way of combining kinesthetic memory and visual memory.

Sometimes I use drawings in my sheet music to help with the memorization process. In the third movement, there are fast changes of atmosphere (figure 3). To allow myself to really exaggerate the mood swings of this passage, I’ve drawn boxes to highlight the differences between the piano and forte dynamics. Following this passage, along with the long note, the music dives, and calms down into a pizzicato line that turns into a fast accelerando in the end. My teacher told me to think of an “easy, carefree walk in a park” before it hits into a pause like running to a wall. When I’m playing this section, I’m trying to play lightly and steadily. Therefore, I drew a sun to remind me of this mental image and to allow me to take time. Strong colors are easy to

Figure 2 The opening melody of the beginning of the second movement.
notice, and you see them immediately when turning the page. This allows me to have that same image in mind every time I play it, so it really sticks into my memory even after playing without the music.

Figure 3 Passage in the third movement. Pink boxes highlight the difference between the piano and the forte. Depictions of yellow suns emphasize the easy-going atmosphere of the pizzicato line. Accelerandos are highlighted with an arrow, to exaggerate the effect.

**Mental practice and the importance of sleep**

I interviewed cellist Brandon Cho, about his memorization process of his performance of Prokofiev’s Sinfonia Concertante in the Paulo Cello Competitions in 2019. He said that whenever he’s on public transport or in a place where there is nothing else to do, he goes through the piece in his mind. I found that interesting and put it to the test in my own practice.

In the beginning of the practicing process, I began imaging some sections or longer phrases in my mind without playing. I imagined myself playing with the right bowings, fingerings, and dynamics of the music. If I found out that there are places, I can’t clearly recall, I would inspect the sheet music and make necessary corrections to my memory. I would imagine shorter passages in different orders, until I could run the entire piece from the first chord until the last long note in my head repeatedly.

To help me with the nerves when the concert was getting closer, I began picturing the venue in my head to ease the stress. I was picturing the moment
of tuning my cello after the first sonata with a pianist, to get into the atmosphere of the solo piece. I was practicing this mindset also by imagining the moment I’m walking to the stage with my cello alone, to keep my composure. I didn’t want to let my mind wander off from the internalized performance routine, to allow myself to enjoy performing and not to fear playing by heart. When I could feel my heart start to race and other physiological responses starting to take over, it was necessary for me to remember to breathe properly for my body to relax and counter these fight or flight responses.

Sleep is fundamental to any learning process. During sleep, the acquired memories from during the day undergo further modification, are refined, and consolidated into core memory (Wagner et al. 2008, Brashers-Krug et al. 1996). In a master class with Helen Lindén, she told me to go through a movement or the music in general just before going to sleep, so that during the sleep the brain processes the information. I tried it with this piece, and I really think it helped me to secure the muscle memory with the sounding part in my head and where to breathe in order for the music to flow naturally. Sometimes when we were going to sleep, my partner asked me what piece I was playing in my mind, because I started to ”breath funny”. This method was so effective that it really puts the whole body in the physical act of playing, without actually touching the instrument.

Sing it yourself

I’ve used a lot of humming and singing in learning music by heart, and I find it very useful. In some movements, singing this music out loud is difficult. Nevertheless, it’s still a very helpful tool.

In the second movement, there are many passages consisting of legato melodies with left-hand pizzicato. Particularly the passage in Figure 4 is very dramatic. It has a lot of forward moving energy, and the rhythm of the pizzicatos vary. It was difficult for me to memorize, because it has a lot going
on: very *espressivo* left hand, slow bow hand and on top of that, the left-hand pizzicatos.

![Musical notation](image)

Figure 4 *Espressivo* melody line in the second movement.

I practiced this by separating the two lines from each other. I played the top line and sang the pizzicato accents. Also stomping my foot loudly worked. And then I switched it up, singing the melodic line and playing the left-hand pizzicatos. This way I combined two memory learning styles: aural and kinesthetic. By utilizing these two memory learning styles I learned this passage pretty quickly by heart.

**Discussion**

The first time I heard the piece, I was immediately drawn to its unusual sound palette and magical harmonies. I recall repeatedly listening to the second movement, as it is my favorite movement of the three for its mystical atmosphere. I don’t think I’ve ever heard this kind of power that the whole piece had, while listening to other classical music. At that time, I did not have the technical knowledge required to start practicing the piece, but I had always wanted to play it someday. In the spring of 2020, Covid-19 hit the world, closing our school. It was a good time to put my concentration and thoughts to something challenging I could practice on my own.

I recorded myself playing the first movement after the summer 2020 for an end of term exam for my teacher that time. During the autumn of 2020 I studied the second movement and in December 2020 I had started to practice
the third movement. For the autumn term exam, my teacher told me to record the last movement in January 2021. So roughly during that half a year, I had run through the whole piece. My teacher that time hadn’t ever played the piece himself, so we weren’t able to go into many details in the music itself. But we had discussed that this is a great opportunity, for my master’s concert in the following year, to dive in deeper into the music. Up until this point we had covered the basic musical ideas and discussed the technical challenges of the piece. In the following year I changed to a different teacher, which presented me with a fantastic opportunity to study the piece further with a teacher who had performed this piece many times. Her teacher had studied this piece with a Hungarian cellist, János Starker, whose interpretation is considered to be relatively authentic, because he knew the composer himself. With my new teacher I got a chance to develop my skills and knowledge of the piece even deeper. She knew all the good tricks and cheats, and the right fingerings and bowings to have the stamina to play the whole piece through, because it is physically a very demanding performance for the body. It was crucial to know where I could play with full force and where to save energy for later.

Reflecting back on the recordings I made during 2020 of this piece, I’ve grown tremendously as a cellist and as a performer. It kept me motivated to see the development I was making at times when I felt like I was moving backwards or not learning fast enough. In those moments I would listen to older recordings and videos of myself playing the piece, to really see the improvement I was making.

I did a run through for my teacher and some friends a few days before the actual concert. The idea was to know how it feels to play the whole thing in one take, because I had never played the whole piece through before. It was interesting to see how tired I got, however due to the adrenaline of the performance I felt tiredness only after I finished playing. I did have a big memory slip in the beginning of the second movement, and some other details
that my teacher and I went through after the run through. I was a bit nervous of how I would be able to memorize them in a few days. But for that situation, the visual memory tools helped a lot. I wrote the right lengths and fingerings of the notes into the music with big red numbers, and I circled the missing pizzicatos. Also reinforcing my aural memory, I sang some phrases again with a conscious effort to try to recall the exact phrasing. By utilizing these memory techniques I was able to correct the mistakes in the actual performance.

Aural memorization was the best suited memory style for me and the easiest one to utilize. I tend to remember very vividly what I hear, which is a huge aid in learning music quickly by listening. This process gave me a more solid understanding of my capabilities as an aural learner and strengthened my trust in my aural memory. Thus, this process of analyzing my memorization techniques made me pay more attention to my innate strengths and the overall experience made me feel good about myself.

I’ve used a lot of visual cues in my practicing before, but not actively to support my visual memory. I noticed, when consciously highlighting details of the music, they stuck out better and made repeating them more efficient while practicing. It was surprising to see the effects of actually drawing things like smiley faces, suns, hearts, thunder, etc. to the sheet music. All the little drawing cues, even the smallest scribbles, made it easier to recall the sections and evoke certain feelings that needed to be expressed in the playing.

For many musicians, kinesthetic memory is the only way to memorize music, but what I gathered in my process, that alone didn’t feel reliable to me. I had to combine other memory styles with it from the start to get the best results and security. For example, combining kinesthetic memory with the aural memory style helped in a lot of cases. Playing around with different tempos than the original tempo helped to secure the kinesthetic memory. The challenges of kinesthetic memory were finding the right fingerings and
bowings, and locking them in place. Having to analyze the best suited fingerings and bowing options was time consuming work but it was essential, because changing them later on in the learning process would disrupt the groundwork that had been built.

Combining analytical memory, visual memory, and aural memory was good for listening to the piece with the sheet music in front of me. I wish I had the knowledge and the comprehension that I would have needed to be able to make a proper form analysis of the piece. At the time it felt like too much work, but in hindsight I should have asked for help to do so. Regardless of the analytical memory being my less utilized memorization strategy I learned a lot about it in the learning by heart process and can explore it further in the future. Even though I’m not an analytical or theoretical person, in the learning process I could rely on my musicality and my level of understanding theory.

With the memorization process I had, I felt that this time I achieved a somewhat coherent image of the piece and could really be happy about the work I’ve made. I could enjoy being on the stage, relaxed, performing. The nerves didn’t take over, because I trusted in myself and all the practice I had done. I had combined multiple memorization techniques in my process, and I felt secure with myself. I had the support of my friends, family, and my teacher, cheering for me in the audience. Watching the video of the concert, I did have mistakes with the intonation here and there and a few memory slips. However, those didn’t affect the overall performance or my mental concentration, thanks to the work I had put into my mental practice which allowed me to always stay on top of the situation.

In future approaches to learning a piece by heart I would concentrate more on performing the entire piece to different people several times before the actual concert. This would help in getting the necessary feedback to improve on overall playing and practice on maintaining the focus throughout the entire piece.
In retrospect, I never felt that I had to force myself to learn something by heart. It all happened quite naturally. Not only because of my will to do so, but also because I had embedded all the memory techniques into the practice system from the beginning. The input and the support my teacher gave me made the journey an interesting experience I will remember for the rest of my life.

It was exciting and fun to consciously learn how to learn the piece by heart during the process of practicing. I was pleased to see that memorizing the piece by heart didn’t happen by accident. I put in the work to make use of the multi-level approach to memorizing. And the fact that it was efficient and didn’t really take time from the groundwork itself, was incredible. I hope that my experience of this process can give ideas to someone with their own memorization practice.
References


