



Feature

Strategies for Memorising

by Jenny Macmillan

Introduction

My aim in this article is to show that performing music from memory is a skill that can be learned rather than one that some people can do 'naturally' and others will never master. First I outline the various types of memory available to learners and discuss the advantages and disadvantages of performing from memory. I then suggest several methods for teaching memorisation systematically, and discuss these with reference to the relevant literature. I discuss the interesting question of whether good memorisers are naturally poor sight-readers, and good sight-readers naturally poor memorisers, before drawing conclusions and suggesting areas for further research.

Memory

Different types of memory include those of (a) **duration** – long-term, short-term and sensory (working) memory; (b) **modality** – auditory, visual, kinaesthetic, olfactory and tactile; (c) **function** – episodic (specific knowledge) and semantic (general knowledge); and (d) **procedural** (practical skill-based knowing how) and declarative (abstract knowing that).

There are three phases to the memory process: encoding, storage and retrieval. The most secure way of performing from memory is to adopt 'multiple coding'; that is, to memorise in a number of different ways, particularly including aural, visual, kinaesthetic and cognitive. The music psychologist John Sloboda (cited in Cook) notes that '*secure knowledge of a piece of music involves forming multiple representations of it*'. To store information in the long term requires it to be rehearsed so it can be transferred to long-term memory. The specific details of a new piece are lodged in episodic memory, but are only secure and retrievable if integrated into the general knowledge structure of semantic memory. According to the psychologist Peter Herriot (again cited in Cook): '*memory is best seen as a process consisting of initial deconstruction followed by subsequent reconstruction*'.

There are many advantages to memorising music. It is necessary to know a piece very well to be able to concentrate on the performance, and often the piece has not reached that stage until it can be played from memory. As Aaron Williamson says, this intense familiarity with the piece enhances the performer's ability to communicate the music to the audience. Playing from memory enables the performer to concentrate on the sound and to understand the whole composition more readily. The music then transfers from conception to performance with no intermediate score. There is no need for a page-turner. And musicians can give impromptu performances to family and friends.

There are also disadvantages to performing from memory. The ability to play from memory varies, and a nervous performer may break down completely with no music. Early errors in learning the music may become reinforced, and the interpretation may become fixed. Performing Western music from memory on some instruments has become part of the ritual of performance. On other instruments, and in other cultures, performing from memory is not expected.

Strategies for Memorising Music

I shall now outline several different strategies which may be used for memorising music.

(i) Analyse Structure

'*Musical structure provides the hierarchical retrieval scheme that is typical of expert memorists*' (Chaffin & Imreh). Researchers seem to agree that it is essential to back up aural, visual and kinaesthetic memory with cognitive analysis of the harmonic and formal structure of the music. Pure repetition is an inefficient way of memorising. If music is memorised without any conscious effort, the music can be retrieved only in the same way. If the performer tries to think about the music, the memory becomes unavailable. The solution, according to Susan Hallam, is to provide a structured musical framework, based on conscious analytic memorisation, into which the material to be remembered is related to other relevant information. This requires more cognitive processing, but leads to the material being permanently stored and more immediately accessible.

Notes are learned in episodic memory. They are transferred more readily into semantic memory if the structure is well understood. Research by Grace Rubin-Rabson in the 1940s suggests analytic study *prior* to keyboard learning; ie, use of semantic before episodic memory. Interestingly, composition students in Michiko Nuki's study were significantly better at memorising than performance students, suggesting that understanding of musical structure is indeed an important factor in memorisation.

(ii) Memorise Early in Learning Process

Edwin Hughes (cited in D A Norman's book *Memory and Attention*) suggests that the performer should concentrate *consciously* on memorising very early in the learning process. He recommends playing through a piece once or twice to get its meaning as a whole. Then memorising should begin. When the piece is known thoroughly, then more reliance can be made on kinaesthetic memory, and then is the time to concentrate on the interpretation.

However, recent research by Roger Chaffin and Gabriella Imreh shows that performance features, which later serve as memory retrieval cues, are *sub-consciously* selected and practised right from the start of



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learning a piece, thus laying the foundations for playing from memory later. The pianist in the study, Gabriella Imreh, says she needs to concentrate on repeats of the theme which are the same but different: *'One important function of performance features is to serve as retrieval cues, eliciting the upcoming passage from long-term memory'*. Working on the third movement of Bach's *Italian Concerto*, she says: *'Eventually, at this level [of practice], you start to have a sort of a map of the piece in your mind'*.

(iii) Focus on Music Rather Than Technique

Interesting research conducted by Norman Segalowitz and his colleagues shows that pianists concentrating on *technical* aspects of the music, either as well as or instead of *musical* aspects when memorising, recall the music less well than when they memorise concentrating on musical aspects. *'It is not the sheer volume of practice and repetition per se that is important, but rather it is the musician's intentional focus during practice that is crucial.'* They say memory is improved by looking at *several* musical aspects when memorising: *'Elaboration creates multiple linkages between representations of the target and other points in the person's semantic network. During retrieval search, the existence of a rich set of connections between target and other parts of the network increases the probability that the target will be found'*.

Experienced performers have highly flexible procedures for solving local problems, whereas inexperienced performers cannot exercise higher-level control because their resources are fully committed to solving immediate local problems, says Sloboda. However, if inexperienced performers play music that is well within their grasp, both technically and musically, they also should be able to give fine performances, and therefore gain positive performing experiences. And a successful memorised performance, claims Hallam, increases confidence so the task becomes less demanding in the future

(iv) Rehearse Mentally to Develop Inner Ear

Rubin-Rabson recommends mental rehearsal either at the beginning of or midway through learning a piece, until performers (Gabrielsson), the teacher of Giesecking, goes to extremes when he suggests the need to know the score by heart before practising on one's instrument. But it is important to be able to hear the music with one's inner ear. Those who are more able to visualise the score and hear it with their inner ear are quicker and more accurate in memorising the music, claims Nuki. Paul Harris and Richard Crozier suggest that pupils should have a mental picture of the shaping, dynamic levels and tone quality in their heads. They advise mentally thinking through the fingering of tricky passages.

However, Don Coffman writes that: *'Physical practice, alone or in alternation with mental practice, were superior to exclusive mental practice. The use of alternating physical and mental practice was no less effective than exclusive physical practice.'* He found that the less advanced the musician, and the more difficult the music, the more important motor practice becomes.

(v) Arrange Several Short Practices Daily

Distributed practice, together with an understanding of the structure and patterns of the music, offers repeated opportunities for the transition of musical material from short-term to long-term memory. Distributed practice was found to be more effective than massed practice for less able learners by Rubin-Rabson. Alf Gabrielsson suggests that instrumental practice should take place with intense concentration to every detail in the performance; therefore practice sessions should be relatively short.

Research by C J Adcock shows clearly the benefits of distributed memorising. One group read through material to be memorised



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sixteen times in one day; the other group read it through once a day for sixteen days. When tested a fortnight after completion of learning, the first group remembered 9% of the material while the second group remembered 79%.

(vi) Break Down Difficult Passages

a. Step-by-step mastery for security

Left to themselves, Linda Gruson found, inexperienced musicians tend to play through whole pieces or sections without stopping. But John Sloboda and his colleagues, and Kacper Miklaszewski, found that effective practice requires the breaking down and repetition of passages that are causing difficulty.

At times of stress, Hughes feels the player must be able to say 'I know that I know every note'. Hughes claims it is important to be able to say the notes, or bring up a distinct picture of them. Another test is to write down the notes from memory.

b. Practise slowly

Slow tempo work is required to prevent errors, and the speed should gradually be increased until full tempo is reached, according to Gabrielsson. Harris and Crozier suggest that particularly troublesome passages can be played slowly in different keys. This will focus the ear and help establish the precise shape. They also suggest that the quickest way to play accurately from memory is to practise slowly. But it is also apparent from the literature that good memory depends on an understanding of the music in addition to accurate knowledge of the notes.

c. Practise hands separately and work out fingering carefully

Research by Rubin-Rabson found that practising hands separately prior to practising hands together produces greater stability and clarity. According to Ralph Kirkpatrick (cited in Cook): 'careful and consistent fingerings are ... an enormous help to the memory'.

d. Intersperse repetitions of short sections with playing complete piece

Miklaszewski conducted research into how a pianist studied a piece by Debussy. The pianist divided the music into fragments, in which the more difficult the section, the shorter the fragments. The pianist often alternated fast/slow tempi; ie, fast practice, then remedial work, then playing fast to assess progress, then remedial. The more the piece was practised, the longer the fragments became and the shorter the time spent on each. This method of practising was also identified by Williamon (cited in Williamon and Valentine) and Chaffin and Imreh.

It seems that musicians should work with as large a portion of the score as is manageable for themselves, ie the less able in small units, the more able in larger units to benefit from the musical value of thinking in larger sections (Rubin-Rabson; Farnsworth, cited in Gabrielsson).

(vii) Correct Errors by Ear When Playing from Memory

If mistakes are made when practising from memory, it is important to listen and correct the errors by ear, rather than refer to the music, in order to develop aural awareness and security. The pianist William Fong advises placing the score next to the instrument, where it can be referred to after finishing playing, rather than on the music stand where it may be glanced at during playing.

(viii) Practise Starting from Anywhere in the Piece

Kinaesthetic memory will develop as a piece is practised repeatedly. One problem with kinaesthetic memorising is that if something does go wrong in performance, it may be very difficult to re-establish the musical thought and continue the performance. Harris and Crozier emphasise the importance of identifying certain strategic points in the music and practise starting at each of those points.

(ix) Listen to Recordings of Master Performances

Knowledge about musical structure takes time to acquire, whether through explicit learning or implicitly through listening to music. Shinichi Suzuki recommended students should listen extensively to master performances of the music they are learning, and of other classical music. This makes playing by ear very easy, for pupils' inner ears are well developed. When performing, the music continues in their heads whatever the fingers do. Odd slips of the fingers are not distracting because performers have the larger picture in their heads.

(x) Start Memorising at an Early Age & from the First Lesson

Just as it is important to develop motor skills and performing skills at an early age, it may be important to start memorising from the earliest lessons. It is natural for young children who learn to play by ear to play from memory.

Andreas Lehmann suggests the amount of memorised repertoire over an individual's lifetime, and involvement in other memory-demanding activities, could have an impact on their ability to memorise music. Suzuki believed that children who could play music from memory would have better memories in other areas, such as school work.

(xi) Memorise in Multiple Environments

The theory of context-dependent memory predicts that memory lapses will occur more frequently when performances are in settings which differ from the learning environment. In this theory, says Jennifer Mishra: 'forgetting is explained as a failure to retrieve stored information rather than actual decay or disappearance of memories'. When information is initially memorised, various aspects of the environment are encoded along with the data. These environmental features later serve as reminders. It may be



important, especially for younger, less experienced musicians, to rehearse in multiple environments, as well as in multiple mental states, in order to anticipate the performing environment.

(xii) Regularly Practise Performing from Memory

Hughes recommends musicians practise performing to others in all sorts of situations, in order to build confidence. When a piece is memorised, he wisely suggests playing the piece just once, leaving it, and playing it again later, for '*In performance there is only one time!*'

Ability to Sight-Read vs Ability to Memorise

Sight-reading and memorising are different processes. The good sight-reader works with rapid and effective chunking using short term memory. In memorising, the performer works slowly with awareness and control of each note until the procedures to a large extent become automatic and stored in long term memory. But there is no reason to believe one ability excludes the other. Research by Nuki found positive correlation between sight-reading ability and memorising ability.

So good memorisers need not necessarily be poor sight-readers, nor *vice versa*; but it is easy to understand why the two skills tend to be mutually exclusive. Good memorisers rely on aural skills and may not need to develop such fluent reading skills, while good sight-readers rely on visual skills and find it frustrating to have to persevere with a score and practise repeatedly in order to memorise the music.

Sight-reading and memorising both rely on a knowledge of structure and both use memory. Sight-reading relies on short term memory, while memorising relies on transferring material from short term to long term memory. Speed of musical sight-reading depends on the performer's knowledge of musical structures and patterns. Memorising, likewise, depends on theoretical and structural knowledge.

Sloboda conducted much research into reading music in the 1970s and 1980s. He suggests it is important to develop musical sensitivity before learning to read. No-one would consider teaching a child to read when at the very early stages of learning spoken language. Children are already fluent speakers before they learn to read; but most learn to read music *alongside* learning a new instrument. This double task is so burdensome that many children memorise each piece as soon as possible and therefore give themselves little practice at reading. It may be better to develop playing from memory from the earliest lessons, while reading music could be taught after musical awareness has been developed.

Conclusions

I have outlined twelve (and there may well be more) strategies used by performers to memorise music. Memorising may come easily to those who follow many of these strategies, while it may be a continual problem for those who have not made an effort to develop the skill. Multiple coding seems to be essential for successful performing from memory. Using many different types of memory offers security of retrieval.

My conclusions from reading the literature are as follows.

Performers use a wide variety of practice strategies, and there seems to be no simple correspondence between any particular strategy and success as a performer, say researchers such as Gruson, Hallam and Miklaszewski. Nuki found the 'whole' method of memorising to be just as effective as the 'part' method (building up two to four bar phrases). However, from studying the literature, it would seem that a systematic learning process is preferable unless the haphazard method is backed up by a great deal of mental rehearsal. Certainly cognitive analysis is required for security of retrieval.

When beginning a new composition, students should study the work in its entirety for details of structure. The piece should then be divided into structural units and studied either at the instrument or in a combination of motor and mental practice. Shorter units are recommended for less able musicians, for more difficult music, and in the early stages of rehearsal. Motor practice is more important than mental practice for less able musicians and for more difficult music. While the technical aspects are being mastered, students need to analyse the structure, phrasing, harmony and dynamics, may listen to and discuss alternative musical performances, and thus consider their own interpretation.

Further Research

We have already seen that multiple coding is invaluable for developing a secure memory. Looking at the hands while practising develops visual as well as kinaesthetic memory. If the music is then played with the eyes closed, the student must rely more on aural and cognitive memories. It would be interesting to investigate the value of practising both looking at the hands and also with eyes closed.

It is possible that progress in the long-term could be improved with appropriate motivation. Students who have real reasons for needing to memorise particular compositions may apply themselves more than those with no reasons, whether the incentive be to please their teachers, to prepare for concerts or competitions, or for their own personal satisfaction.



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cont.

It would be very interesting to conduct research into how influential is the listening aspect on students' ability to memorise. It would also be interesting to discover if there is any correlation between age of starting to play from memory and ability to perform from memory.

Research by Lehmann shows that faster memorisers are more accurate at transposing. I wonder whether the corollary is true. Would developing ability to transpose improve ability to memorise?

I have often listened to students participating in piano competitions. My view is that those who perform from memory generally produce a better sound and are more sensitive to the music and, therefore, communicate the music more successfully to the audience than those who follow the score. Here, again, is an area that would benefit from research. Aaron Williamon's research shows that audiences prefer memorised performances. A slightly different question is whether any one given musician performs better from memory or from the score.

There is nothing in the literature to indicate that everyone does not have the ability to memorise. I believe that instrumental teachers should conscientiously encourage performing from memory from the earliest lessons.

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