

Memorization Without Comprehension: A Window onto the 'Extremities' of the Capability of Human Brain

• *Amjad Saleem*

Abstract:

Muslims across the world memorize the Quran in Arabic for verbatim recall. Memorizers can be native speakers of Arabic, non-native speakers of Arabic, or non-Arabic speakers. The purpose of this study is to investigate expert Quran memorizers on their memorization practices including what they brought to the act of memorization and what, according to them, underlay their success in memorization. Ten memorizers were interviewed about their reflections on their memorization practices. The analysis reveals that while some practices of the Quran memorizers are in line with findings from research literature on memory, there are others which are peculiar to them. The conclusion drawn is that Quran memorizers recite accurately because they do not learn the language. It is further concluded that Quran memorization is a special case, in which a range of extra linguistic factors such as identity, motivation and intention play an important role.

Introduction:

The Quran is the primary religious text of Muslims. It is in Classical Arabic and is read and studied by millions of Muslims all over the world. Almost every Muslim remembers portions of the Quran. Memorization of sections of the Quran is, in fact, part of a Muslim's early education. In the early days of Islam, the Quran was memorized for oral transmission out of necessity, due to low levels of literacy. The memorizers then were native speakers of Classical Arabic. Later on, as Islam spread to non-Arabic societies, individuals not knowing Arabic also had to memorize the Quran for exact recall, and it was here that the potential for a divorce between meaning and form occurred. Yet, if one listens to the non-Arabic speaking memorizers' recitation of the Quran, one might assume them to be competent speakers/users of Arabic: they recite fluently and with ease, following a near-native pronunciation and the lilt of the language.

People can exhibit some truly extraordinary and stunning feats of memory. Shass Pollaks (i.e. Jewish mnemonists of the Talmud) were known for their memory of

• *Ph D (Cardiff, UK), Assistant Professor, Department of English and Applied Linguistics, University of Peshawar.*

the exact location of any word on any page in the Talmud randomly opened¹. A person named JB, memorized the whole of Milton's *Paradise Lost*². Another person named S., possessed a limitless memory for an array of information, including reciting a long and complex table composed of syllables, such as 'ma', 'na', 'sa', and 'va' perfectly eight years after he had learnt it³.

Closer to our everyday experience are performers, such as actors whose flawless verbatim delivery of a long theatrical script on the stage makes us wonder about their memory. However, in most cases actors perform in languages they speak. What role does knowing the meaning play in their memory for the wording of the text? Actors semantically analyse and process the script and their verbatim memory is preceded by a deep understanding of the text^{4,5}. A faithful reproduction of a text has to do with how much a performer/actor owns the text⁶. That is, if a performer has written or created the text, then he or she is more likely *not* to memorise it perfectly. This is partly because of a continuing sense of creative ownership, which means it is okay to change it, and partly because the text is so close to his or her own speech patterns that it will be tempting to assume that it is easy to recall. In contrast, actors given a text written by someone else are more aware of differences from how they speak themselves, and they do not believe they have the right to change the text.

Contrary to reciting a fixed text from memory, there is an art form where artists/performers are not restricted by a written text. Research on oral poetry shows that bards (performance poets) performed long poems live from memory⁷. Trained in the art of oral recitation, they would present heroic stories to their audiences. According to Lord, in oral traditions, bards did not just perform to reproduce one fixed text but also created the text in the process of singing. In other words, although bards would sing poems from memory, they were not restrained by verbatim recall because they improvised and extemporized the text: each telling of essentially the same story was different from any other. They thus mixed formulaicity and creativity in ways that are the basis of ownership and individual performances.

The Quran is probably the only book which is memorized in its entirety by a large number of people around the world. Several researchers have explored the processes and practices involved in Quran memorization in communities where Arabic is a foreign language. Gent investigated the educational significance of Quran memorization by observing and interviewing memorizers in North-East London.^{8,9} Drawing on experiences of Quran memorizers in Islamic schools in Morocco, Yemen, and Nigeria, Boyle described the intellectual, moral, affective, and spiritual effects of Quran memorization on the life of memorizers^{10,11}. Different researchers investigated the impact of Quran learning on cognitive abilities of students.^{12,13} Moore examined the practice of rote-learning in Quranic and public schools in northern Cameroon from a language socialization perspective. Moore argues that learning in Quranic schools is driven by particular "intellectual and moral outcomes."¹⁴ According to Moore,

the emphasis of Quran learning in these schools is on “how and why novices are apprenticed through language into particular activities and identities.”¹⁵

The short account above indicates that although there is some published work on various aspects of the Quran learning, it has not looked at how the practices of Quran memorization fit into research on memory processes and what implications they might have for language learning. The present study is an empirical investigation into finding (a) the main techniques for memorizing the Quran when one does not know any Arabic (b) the sorts of errors that a memorizer is at greatest risk of making (c) how different or similar sighted and blind memorizers are in their memorization practices, and (d) what implications the typical memorization practices might have for language learning.

Participants:

As this study aimed at knowing the *processes* involved in memorizing the Quran, participants who had not only memorized it but were also involved in training/teaching young memorizers were selected. Ten non-Arabic-speaking Quran memorizers who could reflect on and articulate views about their memorization were interviewed. Provision had been made to interview more, but the responses were so similar that it was judged unproductive to recruit more people.

Seven of the participants were sighted while three were blind. Since the research literature indicates that text memorization can benefit from visual reference to the written form, it was anticipated that this might also be an approach used by Quran memorizers. However, it is not at all uncommon for blind people to become Quran memorizers, so Quran memorization, clearly, is not always reliant on this technique. In order to gain some insight into this factor, it was, therefore, decided to interview some blind memorizers alongside the sighted ones. Sighted memorizers were those who had normal eyesight: they could read the text without any visual aids other than, if necessary, prescription glasses, and had memorized the text by looking at the book; blind memorizers, on the other hand, had lost their vision in early childhood and they confirmed that they had not seen text in written form and had memorized the Quran by listening to their teachers. Although women do memorize the Quran, the focus of the study was exclusively on men to avoid the variable of gender which could potentially confound the results. However, the broader processes involved in memorization could be applicable to women memorizers too.

The sighted participants were based in different mosques in Cardiff, Wales, UK. They were born in Pakistan and had completed their memorization of the Quran in their country of birth. As noted above, the participants were also teachers of the Quran. An important benefit of interviewing teachers in the UK was that they had experience of teaching in two different countries and thus could give a broader picture of memorizing practices from Pakistani culture on the one hand and Pakistani Muslim culture in the UK on the other. The three blind

memorizers were from Khyber Pakhtunkhwa, Pakistan and were interviewed there.

Three of the sighted memorizers were trained as scholars in Islamic Sharia and had studied Arabic as part of their training. However, this was only after they had completed the memorization of the Quran, so they counted as non-Arabic speakers for the purposes of understanding how they had memorized it. The rest of the memorizers had not studied Arabic. Their use of Arabic was restricted to performing religious duties, especially prayers.

Analysis

The making of a memorizer: laying the foundations

The analysis revealed that before starting the actual memorization memorizers are taught Arabic letters and sounds, and how to make ‘words’ out of them. This learning of ‘words’, however, is restricted to phonological form in that they do not learn the meaning (signified) or translation of words and rather only focus on the form (signifier). This is a pre-memorization stage where learners (a very large group worldwide, constituting almost all Muslim children) acquire knowledge of letter-sound relationships in Arabic. At this stage they are only concerned with how to pronounce or read out ‘words’. This process starts at quite an early age— three or four years—and learners internalize the phonotactics of the Classical Arabic without reference to meaning.

The aspiring memorizers have thus already completed reading the Quran text before embarking on memorization proper, and are familiar with phonology (sound) and orthography (written form) of Classical Arabic in that they fluently ‘read’ the Quran. Once they have achieved this basic proficiency in reading Arabic in general and the Quran in particular, they are ready for memorization.

This method of learning the Quran is in keeping with findings from the literature on committing information to memory. Research literature shows that familiarity with lexical and phonological properties of a language enhances the processing capacity of phonological short term memory, resulting in a greater learnability of language.¹⁶ Gathercole argues that familiarity with the phonotactic structure of words yields their better learnability as compared with words with which the learners are not familiar.¹⁷ Similarity of phonotactic patterns between the learners’ native language and the to-be-learned foreign language is an important factor in the learnability of words: repeating and remembering words that share phonotactic structure with words in one’s native language is easier than for ones without such similarity.¹⁸ Learning to ‘read’ Arabic at quite an early age can thus be said to have benefitted the Quran memorizers in committing the text to memory.

This early attention to the phonology of the Quran text indicates the importance of accurate pronunciation in tradition of Quran memorization. If one cannot read the letters and pronounce them correctly, one could easily introduce errors that would then be passed on to the next generation of memorizers until there was

more than one version of the sacred text. Moreover, this basic knowledge of Arabic phonotactics might help them in chunking sounds and letters into 'words', 'words' into phrases, and phrases into verses, leaving more capacity in working memory. That is, memorizers' knowledge of Arabic phonotactics enables them to arrange sound patterns into predictable and pronounceable (intelligible) word sequences and longer stretches of text. Once the memorizers have completed their 'reading' of the text, they embark on memorization proper. The practice of Quran memorization is in line with what Moore calls 'guided repetition' which "involves modelling by an expert and imitation by a novice, followed by rehearsal and performance by the novice".

Almost all Quran memorizers begin young. According to the participants, starting early in life improves the outcome in terms of time taken to memorize the text, how well it is learned, and the accuracy of pronunciation. The emphasis on and the practice of starting memorization early in life coincides with findings of research on brain plasticity in that changes in neural connections and the ability to learn information in general decays with age.¹⁹ Children complete the process within a short period of time and remember it better, compared to older children or adults. It needs to be noted that some learners memorize the Quran in an exceptionally short time which might be the result of differences in individuals' aptitude.

Repetition and rehearsal—a key to the Quran memorization:

From interviews with the Quran teachers-memorizers it was clear that they consider phonological memory as their primary mode of learning. They repeat and rehearse the text to lodge and maintain it in memory because they do not have *meaning* to help them in their memorization. In everyday life while people could repeat information they do understand, they normally use semantic memory to help. In situations where semantics is not available, repetition takes the primary or predominant role.

All participants had a consensus on the central role of repetition as not only a means of committing text to memory initially, but also to refresh and consolidate it for long term recall. Repetition and rehearsal are an inherent part of their memorization. These views on the role of repetition resonate with findings from the literature according to which repetitions strengthen neural links in the brain leading to the consolidation of memories.²⁰ Repeated and frequent rehearsal as reported by the Quran memorizers may thus have left permanent traces in their brain resulting in inefficient/entrenched memory of the text. The emphasis on the role of repetition and rehearsal in memorizing and remembering the Quran is in keeping with claim that repetition of sequences in Short Term Memory (STM) is necessary for chunking in phonological Long Term Memory (LTM) as well as consolidation of information in LTM.²¹

Conversations with the participants also revealed that the memorization is done in a structured way. Each day, before memorizing a new lesson, memorizers revise/rehearse a lesson from the previous day. Then the new lesson is

memorized to a point where it is recalled without an error. The next day the same process is repeated: revising the text from the previous day and adding to it by memorizing some more. In addition to this, a memorizer regularly revises text memorized over the last, say, 10 to 15 days. From what the participants said it was clear that there is a method in their memorization. They do it in a structured and methodical manner. The whole Book is memorized incrementally and rehearsal is distributed over set intervals. This is in line with findings from the literature according to which optimal learning happens when distributed over time as compared to massed practice.²² These views are also in consonance with accounts of Quran learning reported elsewhere in this article.

Referring to the actual way of memorization, the participants said that memorizers look at a verse and say a part or whole of it, depending on its size, several times. Then they look away and try to say it again. They only look back into the Book when they find that they cannot remember a particular word or phrase, and focus on that bit, and just practise that little bit a few times, then they try to put it back into the whole. They look away and if they cannot remember a part—whether the same part or a different part, they look back at that and memorize it. So, they piece together parts of a verse. Once they have memorized a verse, they move on to the next verse and say it along with the previous verse. It is important to note that for the Quran memorizers a verse—a short subdivision of the Quranic text—is a basic chunk of memorization. A verse may consist of one, two, or more sentences, often of unequal size. Although the meaning of a verse may flow into the next verse to complete the sense, it is a structural unit in its own right, with a beginning and ending. A chapter of the Quran is neatly divided into verses of different sizes with a sign of a circle at the end of each verse.

The participants were explicit about the role of a verse as a unit of memory. According to them, the memorizers know the physical boundaries of verses and are aware of where a verse starts and ends. With the passage of time, chunking and memorizing becomes easy because the to-be-memorized verses contain words and phrases which the memorizers have already come across. This indicates that the Quran is memorized as a series of subtexts and subparts (i.e. verses, chapters, sections) in a hierarchical manner: memorizers organize their memory of the text in terms of chunks of various sizes (smaller to larger) and memories of the text are laid down in a structured manner. This also means that as they go along, their learning and retention capacity gets larger as compared with when they were novices. With the passage of time they develop better organizational skills for storing information, as they relate the to-be-remembered verses to the already memorized ones. In this way they behave like ‘experts’ or skilled performers.

Chunking is shown to be usually based in semantics. One can organize information into chunks if one has available knowledge of the language system—meaning, word order and phonology, etc. However, Ellis also notes that

features such as familiarity with the phonotactic characteristics of a language and word-likeness can also help in chunking text in a foreign language. This is just as well, since non-Arabic-speaking memorizers do not have any semantics to help them. Moreover, Quran memorizers' chunking of text is based on the structural and 'thematic' organization of the text. Because the Quran is already marked into several divisions of different lengths, memorizers use them as 'ready-made' chunks to organize the text in their memory. Along with this, the memorizers' early exposure to the text, (i.e. having read it before starting memorization) might also help them in chunking and memorizing it.

Repetition and rehearsal—a key to retention and maintenance of the Quran text:

For the Quran memorizers, repetition is a life-long process and does not end with the completion of memorization of the text. They do it the whole of their lives. They constantly repeat and rehearse to retain the text over the long term. This means that memorizers are involved in a continuous and unending process of recall/retrieval and reconsolidation. Once they have completed the recitation, they start anew. Sometimes some verses or a particular chapter or section of the Quran may need more practice to remember than the rest. In addition to the rehearsal schedule mentioned above, memorizers do even more rigorous and intense rehearsal during the Muslim holy month of Ramadan. This means that memorizers engage in 'private' rehearsal before recitation in the night prayers. Although a majority of memorizers rehearse regularly and frequently, not every memorizer does so.

This indicates that the Quran memorizers devote a considerable part of their time to memorization: they not only spend thousands of hours to commit the whole text to memory but also keep repeating it all their lives. It is thus possible to liken the Quran memorizers' superior memory performance to other kinds of skilled performers. Although the model of skilled performance deals with musicians, chess players and sportspersons, it sheds light on the Quran memorizers' 'expert' memory insofar deliberate practice over time is concerned. Quran memorizers' exceptional memory can be attributed to sheer resoluteness, commitment, and years of hard work.²³ Like skilled performers, the Quran memorizers' 'expert' performance is domain specific, i.e. it is limited to their field of expertise and does not go beyond it.²⁴ The participants of the present study confirmed that they do not have superior memory for other tasks. Also, like skilled performers, the Quran memorizers' specific ability at their task is not innate but rather acquired through repeated practice.

It is clear from the participants' account that Quran memorization is not an ability that one either has or does not have. The Quran is to be learnt, rehearsed, and remembered for a lifetime. It is a skill that needs training and practice. In a nutshell, it can be said that Quran memorization is more a product of nurture than nature. That repetition is essential to memorize and remember the Quran is also noted by other researchers, such as Gent who investigating the educational

significance of Quran memorization observed and interviewed memorizers in north-east London. He found repetition an important means to commit the Quran text to memory.

The role of mnemonics in the memorization of the Quran:

The long-term retention of a text in the absence of semantic cues is an anomaly in memory research, where it is considered that only memory for meaning is long-lasting, while the memory for surface features (such as sounds) can only last for a few seconds.²⁵ Something else must be at work, for the Quran to be successfully memorized.

Various factors, such as phonological patterning (alliteration, rhythm, and rhyme, etc) play a role in retaining the form resulting in better memory for poetic text than prose.^{26,27} The participants of this study recognized a role for rhyme and rhythm in memorizing the Quran, although they ascribed their memorization more to help from God than to any poetic devices.

Working memory, due to its limited capacity and the limited duration over which it can hold information is inadequate to explain the memorization of a large text, such as the Quran.²⁸ However, the visuospatial component of the working memory supports long term recall of information. It is like an octopus's extra tentacle giving an extra anchor in memory. The sighted memorizers said that they and their pupils encoded the text both phonologically and visually. This means that sighted memorizers make a very strategic use of the printed form of the text by hooking the fleeting phonological memory into a concrete visual image. By linking up sounds and visuals of words, a unified memory representation of the text is made. The printed form is thus used as an external aid to memory, a sort of mnemonic link. In other words, the pictorial representation provides them with a cognitive mnemonic anchoring for a long term representation. While recalling, they scan the text in their heads as if reading from the actual written text. It suggests that the memorizers' retrieval is based on both attributes (i.e. sound and picture) of the word.

There is, however, something specific and, in a way, unique to the Quran memorizers' visuospatial memory. According to Quran memorizers, they memorize from a particular copy of the Quran which they keep with them as memory guide/aid for later occasions. Memorizers may find it difficult to do without such a 'personalized' copy of the Quran. It suggests that the memorizers' personalized copy serves as a mnemonic link for remembering the text: they mentally photograph and visualize the whole of the Quran text in their mind. It is like they have a copy of the Quran stored in their mind to which they have access around the clock.

The above findings are in line with the dual coding theory²⁹, according to which simultaneous visual and auditory coding leads to superior recall compared to single coding. Given what the participants said regarding the function of printed text in memorizing the Quran, it can be claimed that they create a 'semantic' or mnemonic hook (a visual link) as a proxy for meaning, not only to increase their short term

memory but also to transfer the text into long term memory. It means that they make up for the missing meaning component by substituting the meaning of the text with the image or printed form of the word as proxy for meaning.

The blind memorizers—a class apart:

So far we looked at data from sighted memorizers. The account of Quran memorization is incomplete without taking blind memorizers into account. Just when you think you have understood how Quran is memorized, you have another set of memorizers who are completely blind: they have never seen text in written form and cannot, unlike the sighted memorizers, link sound to the visuals and yet they memorize and recite the Quran as well as the sighted memorizers. So, what do the blind memorizers do instead, to shore up the phonological memory?

From what the blind memorizers said it was clear that the difference between the blind and sighted memorizers in terms of their memorization is not qualitative but quantitative. The blind memorizers repeat more, at least while they memorize the Quran, than the sighted ones. Unlike sighted memorizers who use a visual link as a possible replacement for semantics, the blind memorizers' only means of memorizing the Quran is phonological. This means that the notion of a visual image as a semantic/mnemonic link cannot be the only way to retain and maintain the Quran text over the long term. However, as we know that phonological memory is short-lived, it ought, logically, to be impossible to commit the Quran text to memory using only the sounds of its words. So, how do the blind memorizers remember it over the long term? Do they also anchor their memorizing in something as a substitute for meaning?

Insofar as the participants of the present study are representative, it seems that blind memorizers elaborately process non-semantic information, such as physical quality (i.e. tone, pitch, etc) of the voice. They also associate the sound of words and the feeling thereby generated, with objects/images and concepts in their imagination. However, there is a difference between sighted and blind memorizers insofar as imagining/forming an image is concerned. That is, while the sighted memorizers' images are visual, blind memorizers' might be touch and sound based. The relationship between objects and concepts in case of the blind memorizers might be more arbitrary as compared to sighted memorizers' where a corresponding relationship exists between the written and spoken forms.

In light of the conversations with blind memorizers we can pretty well understand the role of the mnemonic hook. Blind memorizers create or imagine something that can act as a hook for them to attach the sound to. Or they use the mnemonic hook (i.e., something other than semantics or visual information) as a means for finding the remembered information. Unlike the sighted memorizers, who have a mnemonic hook available to them in the shape of the printed words (i.e., a visuospatial link), blind memorizers imagine a link for themselves. This suggests that different hooks can be used, according to different modes of memorization. It is also possible that blind memorizers, being solely dependent

on their hearing faculty, may have more developed listening skills than the sighted memorizers.

There does not seem to be a fundamental difference between the blind and sighted memorizers' rehearsal routine. After the Quran has been memorized, both sighted and blind memorizers are engaged in almost the same amount of rehearsal on daily basis. The difference is only in the mode of memorization: sighted memorizers, in addition to being engaged in regular and frequent rehearsal to help retain the fleeting phonological information, also use the visual image. So, it is just a different way of doing memorization and remembering. It may be noted that sighted memorizers primarily memorize from a printed copy of the Quran. Blind memorizers, on the other hand, memorize by listening to their teachers.

Is memorizers' efficient memory all about rehearsal and repetition?:

All of the Quran memorizers (i.e. sighted and blind) have available to them another potentially strong cognitive link for a long term recall i.e., the organizational structure of the Quran. The Quran as a text is organized in a structured way and both the sighted and blind memorizers fully exploit the structure of the text for long-term retention. Structurally, the Quran is divided into thirty sections called "Juz" (جُزء). Each "Juz" (جُزء) has a name or a title and is divided into four parts or quarters. The Quran is further divided into Surahs (سُورَة) or chapters. There are 114 Surahs (سُورَة) of unequal size with each chapter having a title. Moreover, there is a fixed sequential order in which the Quran is organized in terms of verses, chapters, and sections. A memorizer knows all these details as part of his memorization. It means that when he memorizes a verse, he also memorizes where it is on the page and in which chapter or/and section. It may be likened to locating book in a library: learning not only what books you have on your shelf, but where to find them. However, this ability of knowing where a particular verse occurs in the Quran is not equally available to all memorizers: some of them may be better at knowing and remembering this information than others.

Practical manifestation of the above faculty as reported by participants was provided when I asked memorizers to recite in response to a verse I recited for them. I would recite a verse or a few words from a verse at random from anywhere in the Quran and would ask a participant to recite from that point onwards. He would immediately start reciting and would continue until I asked him to stop. In addition to this, he would correctly tell me which chapter and section of the Quran the verse was from and whether it was in the beginning, middle or the end of a chapter or a section. However, when the cue was a single word they would find it difficult to recite from there onwards. Their explanation was that the cue word existed in several places in the Quran and so they were not sure which particular verse began with that particular word. However, when I asked them to recite any verse starting with that particular word, they would take a while but were able to recite the verse. On the whole, one word was not a reliable cue for them. Even a phrase at times was not a sufficient recall cue, because a phrase sometimes

occurred in too many verses to be a strong and differentiating cue. Memorizers would, therefore, ask for a complete verse or a couple of verses as a cue. As already mentioned the size of a Quranic verse is variable and may change from very short (i.e. consisting of a few words) to very long (i.e. consisting of several sentences).

This suggests that a verse normally counts as unit or chunk of memory for the Quran memorizers. Secondly, verses might be stored in their memory in a coherent, orderly and sequential manner and not in fragmentary and disjointed bits and pieces such as isolated and random words in a list-learning situation. The memorizers' quick recall of the text in response to a verse cue also shows that they had gained a certain amount of automaticity which might be a result of extended practice.

Literature on memory processes^{30,31} suggests that some 'surface' features might end up in long term memory by means of deep cognitive processing. From what the participants said, it can be argued that another 'surface' feature i.e., knowledge about the structure of the Quran text might have been deeply processed, and used to lodge the text in long term memory. Certainly it seems that the memorizers have internalized structural schemata of the Quran text to guide their retention and retrieval of it. In addition to their knowledge of which chapter or section a verse is located in the Quran, the memorizers also seemed to have a mental map of the Quran text. They not only knew the structure of the Quran at a global level (i.e., how many sections and chapters there are and in what order) but were also familiar with it at a local level (i.e. where a section or a chapter begins and ends and where a quarter or half of a part is). This means that while memorizing the Quran, they memorized three things: the text itself, where it is located in the Quran, and the overall map of the Quran.

The memorizers thus seem to have internalized the Quran in an interconnected, integrated and coherent form in a hierarchical manner, forming a neat representation of chunks at different structural levels. Might it thus be possible that their efficient retrieval is based on this organizational structure? This implies that the Quran exists in the memorizers' memory at several concrete levels, ranging from verses to the chapters through to sections to the whole of the text. The Quran text, due to its inherent structure and organization, thus seems very chunkable: different structural divisions, varying in length, serve as chunks in their own right. Every chunk at a lower level makes up a part of the chunk at a higher level. This facilitates the memorization of the Quran in a methodical, systematic and planned manner.

Memorizers also normally rock their bodies during recitation. They move back and forth or from side to side, especially gently or rhythmically. Although the participants of this study did not believe that rocking the body helped them in memorization and recall, research on kinaesthetic memory suggests that moving the body creates a pathway to learning: by moving our body, we reinforce our memory in a different way. The moving of the body alongside moving the

articulators may lead to a stronger retention rate. Some research considers rocking of the body by memorizers as a mnemonic device.³²

The discussion so far has revealed that although the memorizers' primary means of committing Quran to memory is phonological, they seem to make use of several pathways or modalities to keep the text in memory. For example, while sighted memorizers make a particular use of visuospatial information (i.e. image, colour, font size and location of the Quran text on the page) to recall the text, blind memorizers use auditory memory and one memorizer at least used some kind of imagined 'visuospatial' details, and perhaps muscle memory from experiences of walking up hills and sensory memory of walking through an orchard, to hook the sound into. In addition, all the memorizers internalized the structural and organizational make-up of the text, using it as a mnemonic hook. The memorizers potentially use multiple means or, one might say, 'tentacles', to hold on to the text. By using different modes and means of memorization they make sure that the text sticks in their memory over the long term. So, if the grip of one tentacle weakens or becomes loose, the other is there for the rescue. In summary, conversation with Quran memorizers confirmed that their efficient recall is a result of coding the text at multiple levels i.e. phonological/articulatory, acoustic, visual, and structural.

What sorts of errors do the informants consider common?:

Another interest for the present study was the level of risk that memorizers ran of making mistakes when recalling the text and what kind of mistakes that might be. Information on the nature of mistakes would inform us on how the Quran has been memorized and what the memorizers can do to avoid or correct them. It would also tell us about the nature of their memory. It was clear from what the participants said that memorizers sometimes have problems with sequential memory. Similar or identical verses occurring in different places in the Quran cause confusion, leading to errors in recall. The memorizers said there was a risk of sometimes muddling up similar or identical verses from different parts of the Quran.

I also asked the participants about other types of mistakes that memorizers were at risk of making in recitation. For example, I asked them whether memorizers confuse semantically related words, such as 'man' with 'woman', and 'morning' with 'evening', etc. Their answer to this was *No*. This is in keeping with their not knowing the meaning of the words they are reciting, and may be more like recalling codes or patterns such as triangle, triangle, square, circle, etc. With regards to making phonological errors, especially errors in recalling similar-sounding words, they had a consensus on not making such errors.

Important to this study is the finding that memorizers do not make semantic errors in that they do not confuse or muddle up semantically related words. If one does know the meaning of a word, it creates the risk of semantic errors, but with these memorizers, it has been proposed (see above) that they might use other hooks. Of course, there is the risk of this leading to different sorts of errors.

For example, they could forget where on the page the text is. As short term memory is limited in nature and cannot accommodate a long text, it is proposed that the Quran text might be stored in LTM with hooks other than text meaning.

Most importantly, because they do not engage with the meaning of the text, the memorizers are entirely unable to develop any understanding of the patterns of Classical Arabic. As a result, there is no risk that they will make the types of errors that language learners typically make, such as putting a masculine ending onto a feminine word root. Indeed, as argued, the lack of sensitivity to language patterns, which keeps their recall highly accurate, is a result of their faithful adherence to the phonological form without attempting to learn the language.^{33,34}

Verbatim recall—the emphasis on super-correctness in recitation:

The interviews with the informants showed that memorizers' only focus is on correct and accurate reproduction of the text. The memorizers' job is to memorize the Quran for errorless verbatim recall i.e. their input and output have to be completely identical. The importance they place on accurate pronunciation and exact recall cannot be overemphasized: memorizers have neither to add nor delete a word from the Quran text. This emphasis on exact recall explains the amount of rehearsal and repetition they engage in. In other words, they do not and cannot take risk with their memorization. It was clear from the conversation with the participants that since mispronunciation or misquoting Quran is considered a sin, memorizers need to internalize every detail of the text. The analysis revealed that memorizers attend to every word of the Quran because if they forget, there is no way to retrieve it because they do not know the language.

It means that memorizers do not reconstruct text from memory not only because they do not know the language but also because they are not allowed to do so. They do not and cannot take the risk of reconstructing the text, because that is too dangerous and blasphemous in that one might replace or confuse a word of the Quran with a non-Quranic word. Although the Quran memorizers said that knowing Arabic is helpful in the sense that it guards against committing grammatical mistakes, they insisted that they would not leave recall to their know ledge of the Arabic. This indicates that an aspect of memorization is the discipline to avoid being tempted into thinking it is an exercise in learning the language – it is not. Memorizers are duty bound to (re)produce the verses intact, so every effort is made to curtail and minimize any possibility of committing an error in recall. The memorizers might not want ever to get the text wrong, even in rehearsal, because it will contaminate the memory for the correct version. The issue of extreme avoidance of errors provide a key explanation with regard to non-Arabic speaking memorizers' awareness of the morphological patterns of Classical Arabic.

Conclusion:

The analysis of the data showed that the memorizers had four key features to their acquisition: immediate repetition while reading, immediate repetition while not looking at the text, delayed recall, and repetition at different intervals

depending on the amount of text they memorized. Moreover, after completing memorization, the memorizers rehearse the Quran for the whole of their lives. While the first three conditions match the typical learning patterns described in the second language learning research literature, the fourth one, that is, life-long rehearsal is untypical of memorization practices discussed in literature. The most surprising thing however was that Quran memorizers were not involved in deep cognitive processing of the text. Their apparently long term memory of such a long text is, rather, a function of repeated rehearsal, and determination to memorize the text. One of the main themes that ran through the interviews was their devotion to, and affective association with the Quran. The memorizers are driven and motivated by a purpose and a cause: to preserve the word of God and to have the best reward in the life Hereafter. Their memorization can be said to be controlled more by emotional involvement than cognition.

The processes and effects of Quran memorization examined here generated some findings that the existing research literature on memorization and language learning did not directly predict. This indicates that Quran learning is a special case, in which a range of extralinguistic factors play an important role, including those associated with identity, motivation and intention. In one sense this simply confirms what Quran memorizers have always claimed—there is something very special, indeed mystical, about Quran memorizing. But this study has been able to point to why it is special, and why the approach traditionally taken to Quran memorization is vital and so effective. More broadly, this study provides a distinct marker for other research into memorization, by constituting the extreme end of a continuum of human cognitive activity. Quran memorization has certainly not yet revealed all its mysteries.

References

1. Stratton, George M. "The mnemonic feat of the Shass Pollak." *Psychological Review* 24, no. 3 (1917): 244-247.
2. Seamon, John G., Paawan V. Punjabi, and Emily A. Busch. "Memorising Milton's Paradise Lost: A study of a septuagenarian exceptional memoriser." *Memory* 18, no. 5 (2010): 498-503.
3. Luria, Aleksandr Romanovich. *The Mind of a Mnemonist: A Little Book about a Vast Memory*. New York: Harvard University Press, 1968.
4. Noice, Helga, and Tony Noice. "The effects of segmentation on the recall of theatrical material." *Poetics* 22, no. 1-2 (1993): 51-67.
5. Noice, Helga. "Two approaches to learning a theatrical script." *Memory* 4, no. 1 (1996):1-17.
6. Wray, Alison. *Formulaic Language: Pushing the Boundaries*. Oxford: Oxford University Press, 2008.
7. Lord, Albert Bates, Stephen Arthur Mitchell, and Gregory Nagy. *The Singer of Tales*. Vol. 24. Cambridge: Harvard University Press, 2000.

-
8. Gent, Bill. "The world of the British hifz class student: observations, findings and implications for education and further research." *British Journal of Religious Education* 33, no. 1 (2011): 3-15.
 9. Gent, Bill. "But you can't retire as a Hafiz: fieldwork within a British hifz class." *Muslim Education Quarterly* 24, no. 1-2 (2011): 55-63.
 10. Boyle, Helen N. *Quranic Schools: Agents of Preservation and Change*. New York: Routledge, 2004.
 11. Boyle, Helen N. "Memorization and learning in Islamic schools." *Comparative Education Review* 50, no. 3 (2006): 478-495.
 12. Wagner, Daniel A. "Learning to read by 'rote'." *International Journal of the Sociology of Language* 42 (1983): 111-121.
 13. Scribner, Sylvia. *The Psychology of Literacy*. Cambridge: Harvard University Press, 1981.
 14. Moore, Leslie C. "Learning by heart in Qur'anic and public schools in northern Cameroon." *Social Analysis: The International Journal of Cultural and Social Practice* 50, no. 3 (2006): 109-126.
 15. Moore, Leslie C. "Body, text, and talk in Maroua Fulbe Qur'anic schooling." *Text & Talk* 28, no. 5 (2008): 643-665.
 16. French, Leif M., and I. O'BRIEN. "Phonological memory and children's second language grammar learning." *Applied Psycholinguistics* 29, no. 3 (2008): 463-487.
 17. Gathercole, Susan E. "Is nonword repetition a test of phonological memory or long-term knowledge? It all depends on the nonwords." *Memory & Cognition* 23, no. 1 (1995): 83-94.
 18. Ellis, Nick C. "Working memory in the acquisition of vocabulary and syntax: Putting language in good order." *The Quarterly Journal of Experimental Psychology: Section A* 49, no. 1 (1996): 234-250.
 19. Nadel, Lynn, and Morris Moscovitch. "Hippocampal contributions to cortical plasticity." *Neuropharmacology* 37, no. 4-5 (1998): 431-439.
 20. Nader, Karim, Glenn E. Schafe, and Joseph E. LeDoux. "The labile nature of consolidation theory." *Nature Reviews: Neuroscience* 1, no. 3 (2000): 216-219.
 21. Ellis, Nick C. "Constructions, chunking, and connectionism: The emergence of second language structure." In Doughty, J. and Long, H. (eds.), *The Handbook of Second Language Acquisition* Oxford: Blackwell (2001): 5-66.
 22. Bjork, Robert A. "Retrieval practice and the maintenance of knowledge." In Gruneberg, M. M., Morris, P. E., and Sykes, R. N. (eds.), *Practical Aspects of Memory: Current Research and Issues II* London: Wiley (1988): 396-401.
 23. Ericsson, K. Anders, Ralf T. Krampe, and Clemens Tesch-Römer. "The role of deliberate practice in the acquisition of expert performance." *Psychological Review* 100, no. 3 (1993): 363-406.
 24. Ericsson, K. Anders, and Neil Charness. "Expert performance: Its structure and acquisition." *American Psychologist* 49, no. 8 (1994): 725-747.
 25. Sachs, Jacqueline Strunk. "Recognition memory for syntactic and semantic aspects of connected discourse." *Perception & Psychophysics* 2, no. 9 (1967): 437-442.

-
26. Rubin, David C. *Memory in Oral Traditions: The Cognitive Psychology of Epic, Ballads, and Counting-out Rhymes*. New York: Oxford University Press, 1995.
 27. Tillmann, Barbara, and W. Jay Dowling. "Memory decreases for prose, but not for poetry." *Memory & Cognition* 35, no. 4 (2007): 628-639.
 28. Baddeley, Alan D. "Short-term memory". In Baddeley, A., Eysenck, M., and Anderson, M. (eds.), *Memory* (2010): 19- 40.
 29. Paivio, Allan. "Dual coding theory: Retrospect and current status." *Canadian Journal of Psychology/Revue Canadienne de Psychologie* 45, no. 3 (1991): 255-287.
 30. Morris, C. Donald, John D. Bransford, and Jeffery J. Franks. "Levels of processing versus transfer appropriate processing." *Journal of Verbal Learning and Verbal Behavior* 16, no. 5 (1977): 519-533.
 31. Tulving, Endel, and Donald M. Thomson. "Encoding specificity and retrieval processes in episodic memory." *Psychological Review* 80, no. 5 (1973): 352-373.
 32. Rosowsky, Andrey. "Decoding as a cultural practice and its effects on the reading process of bilingual pupils." *Language and Education* 15, no. 1 (2001): 56-70.
 33. Saleem, Amjad. "Does memorization without comprehension result in language learning?" PhD dissertation., Cardiff University, 2015.
 34. Saleem, Amjad. "Formulaic memorization as barrier to language learning." *Kashmir Journal of Language and Research* 21, no. 1 (2018): 11-27.