Philosophical Perspectives on Memory and Imagination

Edited by Anja Berninger and Íngrid Vendrell Ferran

First published 2023

ISBN: 978-0-367-70877-1 (hbk)
ISBN: 978-0-367-72096-4 (pbk)
ISBN: 978-1-003-15342-9 (ebk)

Chapter 9

Memory, Imagination, and Skill

Amy Kind

DOI: 10.4324/9781003153429-13

The funder for this chapter is Claremont McKeena College

Routledge
Taylor & Francis Group
NEW YORK AND LONDON

9 Memory, Imagination, and Skill

Amy Kind

Philosophers have long recognized many commonalities between memory and imagination. They are thought to be similar phenomenologically – even if, in a tradition stemming from Hume, the phenomenal feel of imagining is thought to be more "faint and languid" than that of remembering.[1] There is evidence that similar brain regions are involved in these two mental activities.[2] They are also thought to be similar functionally, in that both allow us to engage in mental time travel, with memory taking us into the past and imagination taking us into the future. In fact, this functional similarity has led some philosophers to claim there is a continuum of sorts between memory and imagination, perhaps with memory even being best understood as a sub-species of imagination.[3] In this chapter, however, I want to focus on a different commonality between memory and imagination – namely, that both of them are skills.

In previous work (Kind 2020) relying on an analysis of skill drawn loosely from the work of Jason Stanley and John Krakauer (2013), I suggested that there are three features central to understanding an activity as a skill:

1. It can be done more or less well.
2. It is under one's intentional control.
3. It can be improved via practice/training.

When we think about the many different sorts of varied activities that are usually classified as skills – from juggling and ballroom dancing to playing chess, solving crossword puzzles, and performing mental calculations – this analysis seems to be suitably inclusive.[4] Moreover, it does a nice job of excluding activities that are usually not classified as skills, activities like blinking or raising one's arm or shutting a window.[5] Memory and imagination both fit nicely into this framework.[6]

Let's focus on just the final feature of the three just laid out. Empirical research on memory has clearly demonstrated that memory performance, at least with respect to certain kinds of memory, can be considerably improved via practice. To give just one example, a research team led by K. Anders Ericsson showed that after extensive memory practice over the

DOI: 10.4324/9781003153429-13

course of two years, an average undergraduate referred to as SF went from being able to recall only 7-digit sequences to being able to recall more than 80-digit sequences (Ericsson et al. 1980). This impressive performance matched those of memory experts with a lifetime of training, such as the famous case of S described in A.R. Luria's *The Mind of a Mnemonist*. Though there is less empirical work on the acquisition and improvement of imagination-based skills in comparison to the empirical work on the acquisition and improvement of memory-based skills, researchers have addressed this issue in some detail in the context of sports psychology and, in particular, in the use of mental imagery training as part of an effort to improve athletic performance. Here too, we find that extensive practice leads to a significant improvement in one's imaginative abilities.

In what follows, I aim to draw out some connections between the skill of memory and the skill of imagination in an effort to learn something about the nature of these activities and the connection between them. If there really is some kind of deep functional similarity between these two activities, one would expect that they might be trainable by similar means and thus that we could learn something about imagination training by reflection on memory training and vice versa. Interestingly, however, an initial look at the empirical research on the respective training regimens does not show much potential for this kind of crossover. Though there are some commonalities that can be found across the training regimens, these commonalities are nothing special over and above the kinds of commonalities one might find in training regimens for skills of any sort. Ultimately, however, when we think more deeply about the details of some of the training regimens for memory, we do turn up some interesting connections. In particular, we find that the two skills are interestingly intertwined.

1 Memory Training

Memory comes in many different forms – I might remember that I wore a pink dress to my high school senior prom; I might remember dancing with my date at the prom; I might remember how to dance the cha-cha. These examples correspond, respectively, to what philosophers call *semantic* (or *propositional*) memory, *episodic* memory, and *procedural* memory. Following a taxonomy developed in the neuroscientific literature by Larry Squire (2009), the first two may be grouped together under the heading of *declarative* memory, while the third can be categorized as a kind of *non-declarative* memory. As Squire characterizes it, the distinction between declarative and non-declarative memory depends on whether there is the capacity for conscious content. Whereas in declarative memory, one often has conscious representations of facts and events, in non-declarative memory, one has unconscious abilities that can be expressed via behaviour "without requiring any conscious memory content or even the experience that memory is being used" (Squire 2009, 127111).

Our interest is in declarative memory. But of the two types of declarative memory, the literature on memory training is concerned almost solely with semantic memory. In fact, as we'll discuss in more detail later, almost no attention has been paid to training with respect to episodic memory.

Let's start with the case of SF, mentioned previously. As described by Ericsson, SF was an undergraduate student with "average memory abilities and average intelligence for a college student" who was hired at an hourly rate to participate in a memory study using a memory span task (Ericsson et al. 1980; see also Chase and Ericsson 1981). In general, memory span tasks provide measures of the capacity of working memory. A study participant is presented with a series of items such as words or letters and asked to repeat them back in order. If the series is repeated back correctly, then the length of the next series is increased by one; if there is a mistake, then the length of the next series is decreased by one. When the elements of the series involved in a memory span task are numbers, it is known as the *digit-span task*, and this was the kind of task presented to SF. Each series was read to him at the rate of one digit per second. When the study began, SF's recall was seven digits, a performance that falls squarely within the typical range for beginners at this task. As noted by Chase and Ericsson, "Normal people's memory spans fall in a very narrow range (around 7 ± 2 items), and this span is fairly stable over a wide range of types of material" (1981, 141). By the end of the study, after having put in approximately 250 hours of practice/laboratory testing over the course of about two years (about one hour a day, three to five days a week), SF was able to recall a series of more than 80 digits.

How did SF manage to do this? Interestingly, after the first four days of the study, over which SF showed almost no improvement, he was ready to give up. He reported to the experimenters that he had reached his limit and that he didn't think that any further improvement would be possible. But then, the very next day, the situation changed: SF began to employ a self-invented mnemonic aid that resulted in a large increase in his recall ability. By day 39, he reached a new high of 22 digits, and his progress increased steadily from there.

To understand the mnemonic aid that SF developed, we need first to understand a little more about SF himself. It turns out that he was a dedicated and skilled competitive runner. Not only was he a member of the university's track and cross-country team, but he was also on a junior college national championship marathon team and a member of the Human Energy Running Club. Given that he competed in a range of long-distance events, he had a great deal of knowledge about running times across a variety of distances. On day five of the study, he began to use this knowledge to help him remember items in the digit series he was being given. For example, if he was presented with the sequence 3,492, he would think of this as "[t]hree forty-nine point two, near world-record mile time." He would then start to group other digit combinations in a similar way – e.g.,

as a very poor mile time, an average mile time for the marathon, an average workout mile time, and so on. As the memory study progressed, SF developed an increasingly sophisticated system that included workarounds for dealing with digit combinations that were not easily handled by his initial mnemonic strategies. For example, around day 60, he added other kinds of elements to his system, like ages and dates, in an effort to account for digit groups that did not correspond well to running times. Consider a sequence like 896. This resists conversion to a running time because the second digit is too large. To handle this, SF thought of it as "eighty-nine point six years old, very old man." For a sequence like 1943, he thought of it as "near the end of World War II" (Chase and Ericsson 1981, 149).[7]

For our purposes, it will be useful to draw attention to four further points, two about SF's use/development of this mnemonic and two about the use/development of mnemonics more generally.

First, SF developed this mnemonic entirely on his own. He was not given any instruction about the use of mnemonics or trained to develop one. He simply started using it. We often think of instructor feedback as a critical element of training. But insofar as SF received feedback from the experimenters in his sessions with them, the feedback simply consisted in letting him know whether he was correctly or incorrectly recalling the series of numbers given to him. He was not given any feedback on his memory techniques, how they could be improved or adjusted, or how he could make better use of them.

Interestingly, a subsequent study involving an individual referred to as DD showed that SF's mnemonic technique could be taught to another individual with a similar knowledge base. Like SF, DD was also a competitive runner who had been highly successful in track and cross-country at both the high school and college levels but whose memory and intelligence abilities would be seen as average prior to the start of the memory study. In informal conversation, SF explained to DD the technique that he used for handling the digit-span tasks. With practice, DD was able to master the technique – thinking of series like 142 as "one minute, forty-two seconds, right around a world record half-mile time" and series like 673 as "sixty-seven point three years, just past retirement age" (Staszewksi 1990, 254). Having exhibited the ability to recall spans of eight digits in his first practice session, DD increased his span to 106 over the course of his four+ years of practice (Staszewksi 1990, 253). Though DD used different categories of running times from SF, and though he subdivided digit lists differently from SF, the basic technique he used resembled the one developed by SF in all key respects. Importantly, however, after the system was informally explained to him by SF, he was not given any further instruction or direction. Thus, like SF, he was essentially self-trained.

Before we move on, it's worth noting that SF's and DD's performances, at the time of their studies, were comparable to the known memory experts of the day. I mentioned briefly earlier that SF compared favourably to S, the famous case described by Luria, but SF and DD also compared

favourably to the memory experts of the 1980s and 1990s who were competing in national and world competitions. Interestingly, in the decades since SF and DD were initially studied, memory competitions have taken off in popularity, and performance in events such as the digit-span task has consistently improved. In 2004, the digit-span task at the World Memory Championship (called the *Spoken Numbers* event) was won with a score of 100 digits. In 2011, Feng Wang set a new record with 300 digits.[8] At the 2019 event, Ryu Song I set a new world record with a score of 547 digits.[9]

The second point to note about SF's mnemonic is its limited applicability. Because SF's mnemonic aid was very specific to the kinds of sequences that he was being given – that is, sequences of *digits* – it did not transfer to other kinds of memory span tasks. For example, when he was tested on a consonant span test after working on digit spans for three months, he could only remember a series of around six, putting his performance on that task back within the range for normal memory.

Third, several aspects of SF's mnemonic system bring to light an important fact about skilled memory and the use of mnemonic aids more generally: there is good reason to think that mnemonics or other kinds of meaningful association are not just helpful but *essential* for skilled memory. The mnemonics/associations allow the individual to exploit their previous knowledge in a given domain in the service of memory. When we look beyond the digit-span task at other kinds of tasks involving memory, we find that skilful performance typically depends on this same kind of reliance on pre-existing knowledge. This can be found, for example, in studies of experts in mental calculation and experts in chess. As Chase and Ericsson emphasize, "[E]xpert memory performance in various semantically rich domains seems to involve coding and organized access to knowledge structures in long-term memory" (Chase and Ericsson 1981, 159).

Fourth, and finally, it's worth highlighting Chase and Ericsson's reflections about why mnemonics work. In their view, what's key is developing a rich hierarchical knowledge structure in which the items to be embedded can be remembered (Chase and Ericsson 1981, 160). It's the structure of the mnemonic that allows individual items within it to be effectively retrieved and hence recalled. Moreover, this structure works best when the elements within it are *interactive*, *concrete*, and *elaborated*. It's those features that supply appropriate and adequate context for retrieval. As an illustration of this general principle, they turn to mental imagery mnemonics. Though SF's mnemonic was not imagery-based, many individuals with skilled memories rely on elaborate imagistic constructions, often referred to as memory palaces, in the service of their memory tasks. The overall technique, referred to as the *method of loci*, is thought to have originated with Simonides, an ancient Greek poet. It was first described in *Rhetorica ad Herennium*, a Latin work on rhetoric dating from the first century BCE and often attributed to Cicero. These imagistic constructions nicely exemplify Chase and Ericsson's point about interactivity, concreteness, and

elaboration. If, for example, you are trying to remember the words COW and BALL, it turns out that you will likely have considerably more success if you don't just visualize a cow standing next to a ball but instead visualize a cow interacting with the ball in some way, such as kicking it.

We see similar instructions dating all the way back to *Rhetorica ad Herennium*:

> When we see in everyday life things that are petty, ordinary, and banal, we generally fail to remember them, because the mind is not being stirred by anything novel or marvellous. But if we see or hear something exceptionally base, dishonourable, extraordinary, great, unbelievable, or laughable, that we are likely to remember a long time. … We ought, then, to set up images of a kind that can adhere longest in the memory. And we shall do so if we establish likenesses as striking as possible; if we set up images that are not many or vague, but doing something; if we assign to them exceptional beauty or singular ugliness; if we dress some of them with crowns or purple cloaks, for example, so that the likeness may be more distinct to us; or if we somehow disfigure them, as by introducing one stained with blood or soiled with mud or smeared with red paint, so that its form is more striking, or by assigning certain comic effects to our images, for that, too, will ensure our remembering them more readily.[10]

We will return to many of these points in Section 3, when we discuss the method of loci in more detail. At that time, we will take up the commonalities between memory training and imagination training and attempt to draw some morals from that discussion. But before we can do so, we need first to learn some more about imagination training itself.

2 Imagination Training

Just as memory comes in many different forms, so too does imagining. Previously, we distinguished two different kinds of declarative memory – propositional memory and episodic memory. Propositional memory seems to parallel directly what philosophers often call *propositional* imagination. Just as I might remember that I wore a pink dress to my senior prom, I might imagine that I wear a pink dress to my son's wedding (a wedding, by the way, that at this point is merely hypothetical). Though philosophers do not typically use the modifier "episodic" when talking of imagination, we might try to map episodic memory onto two different kinds of imaginings that are often discussed: *sensory* (or *imagistic*) imagination and *experiential* imagination. Just as I remember dancing with my date at prom, I might imagine dancing with my son at his wedding. I might do this imagistically, visualizing the two of us on the dance floor. But I might do this experientially, imagining the experiences that I'd be undergoing as we dance.

The kind of memory training we discussed in the previous section largely concerns semantic (propositional) memory. Of the types of imagination just distinguished, this probably most closely parallels propositional imagination. But imagination training tends to target imagistic and/or experiential imagination, kinds of imagination that probably most closely parallel episodic memory. Though episodic memory is recognized as a skill, there does not seem to be a robust literature concerning how one can get better at it.[11]

It's worth noting that there have been empirical studies of individuals who are particularly good at a type of episodic memory – i.e., individuals who have what's referred to as *highly superior autobiographical memory* (HSAM). Such individuals have a very high degree of accuracy when recalling details of daily experiences, including experiences that occurred years or even decades previous. Interestingly, however, this ability does not seem to be the result of explicit training. As noted by one study, HSAM seems quite different from the kind of exceptional memory that we discussed in the previous section, i.e., memory that involves memorization of the use of mnemonic techniques. According to the researchers, "HSAM individuals report that they do not rehearse their experiences or use mnemonic techniques with the explicit intent to create strong memories, unlike many memory experts" (LePort et al. 2016, 1). Moreover, despite their exceptional autobiographical recall, HSAM individuals are not any better than control subjects when tested on memorization tasks. The literature on this phenomenon thus does not yield any special insight into how one might approach memory training with respect to episodic memory.

As we proceed, then, we should keep in mind that there is something of a mismatch between memory training and imagination training. In particular, as just noted, the kind of memory that memory training targets does not parallel the kind of imagination that imagination training targets. But despite this mismatch, one might still hope that there is something important that can be learned about connections between memory and imagination from the consideration of how some varieties of these mental activities can be trained. In particular, we might hope to learn something about the nature of these mental activities and to what extent they are similar (or dissimilar).

Imagination training has been invoked in a number of disparate contexts. To give just a few examples, performance of imagination exercises is discussed in the parapsychology literature (e.g., George 1982), the literature on guided imagery in health (e.g., Tusek, Church, and Fazio 1997), and the literature on shamanism/visionaries (Noll 1985). But one context in which it has featured especially prominently is that of sports psychology, where imagination techniques are frequently employed in the service of the improvement of athletic performance. World-class athletes across a wide number of different sports – from gymnastics to figure skating to canoeing – often dedicate significant time not only to practicing their moves physically

but also to practicing them in imagination. To make their imaginative rehearsals more effective, they dedicate significant time to working on their imagination techniques. They also call upon imagination during competition itself, mentally rehearsing a move or technique in imagination immediately before employing it in actuality. Among the athletes who have talked about the important role that imagination has played in their careers is golfer Jack Nicklaus. As he describes it,

> I never hit a shot, not even in practice, without having a very sharp, in-focus picture of it in my head. First, I see the ball where I want it to finish, nice and white and sitting up high on the bright green grass. Then, the scene quickly changes, and I see the ball going there: its path, trajectory, and shape, even its behavior on landing. Then there is a sort of fade-out, and the next scene shows me making the kind of swing that will turn the previous images into reality.[12]

Before I turn more directly to the relevant empirical literature, there are three clarifications that are worth making. First, though Nicklaus here talks about mental *pictures*, we should be clear from the start that the imagination techniques employed by athletes are not limited to the visual domain. As we will see, they often imagine in other perceptual modalities – not just the look of the club hitting the ball but the sound of it as well – and they also imagine various kinesthetic sensations (e.g., what the club feels like in their hands).

Second, it's also worth making clear that the kind of imaginative effort in which Nicklaus and other athletes are engaged concerns what in other work I have referred to as *instructive* imagination (see Kind and Kung 2016). Often imagination is used in more fanciful ways – as when we play games of pretend, fantasize, or engage with works of fiction. Those uses of imagination – when we aim to escape or transcend the world as it is – are what I call *transcendent* imagination. In contrast, when we engage in efforts of instructive imagination, we aim to learn something about the world as it is, or as it could be. This distinction is especially important for thinking about the assessment of imaginative success and improvement. For example, though accuracy is not typically a relevant factor with respect to transcendent imagining, it is typically a relevant factor with respect to instructive imagining.

Finally, it will be helpful to make one clarification about how to refer to the kind of training under discussion. In the empirical literature, the techniques are standardly referred to as *imagery* training, not imagination training. In fact, psychologists and other empirical researchers tend to favour talk of mental imagery as opposed to imagination as a matter of general practice (and not just in this context). It seems clear, however, that what is meant by imagery is akin to what philosophers mean by imagination, at least when it comes to imagistic or experiential imagination. Cumming and Williams note in a review article that "[a] consistent theme

is to consider imagery as a mental activity involving the internal representations of information without the stimulus present" (Cumming and Williams 2012, 214) – a characterization that sounds very much like the typical characterization of imagination in the philosophical literature. Consider, for example, the opening characterization in the entry on "imagination" in the *Stanford Encyclopedia of Philosophy*: imagining is "to represent without aiming at things as they actually, presently, and subjectively are. One can use imagination to represent possibilities other than the actual, to represent times other than the present, and to represent perspectives other than one's own" (Liao and Gendler 2019).

In addition to these definitional similarities, one also finds various instances throughout the imagery training literature where the terms "imagining" and "imaging" seem to be used interchangeably (see especially Hall et al. 1990). Moreover, when the athletes themselves describe what they're doing, they often put it in terms of imagining (see especially White and Hardy 1998). In what follows, I intend to use the terms *imagination training* and *imagery training* to pick out the same kind of phenomenon, though I will primarily cast things in terms of *imagination* training.

With these clarifications in place, we can now turn more directly to the empirical literature. Just as individuals can improve their skill at memory, as we saw in Section 2, it is possible for individuals to improve their skill at imagination, even for individuals who start off with average skill in this arena. As noted by Cumming and Williams, imagery is

> a collection of skills that are modifiable with training and experience rather than simply a general, undifferentiated fixed ability. … We propose that although some individuals inherently find it easier to image than others, characteristics/elements associated with imaging can be honed and improved. In other words, it is possible to become more proficient at imaging.
>
> (Cumming and Williams 2012, 222)

That said, they also note that there has been surprisingly little attention paid to the question of how exactly one can do this – i.e., how one can effectively develop one's imaginative skills.[13]

Thinking more about what imagination skill involves, however, provides us with some important information in this regard. For example, if imaginative skill is really a collection of skills, as Cumming and Williams note, then we'd presumably advance our understanding of how this skill can be trained by getting clearer on the various elements in this collection. Here we can look at the different kinds of processes that tend to be involved in the use of mental imagery. One important process is that of image generation. After the image is generated, however, it has to be maintained, so image maintenance is another important process. One also often needs to work with the images that one has generated and is maintaining – for

example, one might want to focus on specific details or analyze the content in other ways. And one might also want to transform the images into new and different scenes.[14]

By differentiating these different processes, we are pointed towards different dimensions by which we might assess imaginative skill. When it comes to memory skill, one dimension seems to have primary importance – namely, accuracy of recall. (Though it was not a factor in the training of SF and DD, in some memory training contexts, speed of recall might also assume considerable importance.) But when it comes to imagination training, accuracy of representation is just one of several dimensions that seem to be important. Other factors that seem crucially to matter include the ease with which one can generate the relevant imaginings and the degree of control that one can exert over them, as well as assessments of their duration and their vividness.[15]

These different processes also suggest various guidelines for how imagination training might best be pursued. For example, to assist in the process of image generation, and then subsequently in the processes of image maintenance and transformation, athletes are often provided with imagery scripts. As noted by Cumming and Eaves, individuals new to this kind of imagination training "may find it difficult to maintain an image for even a few seconds because it requires mental effort and attention" (2018, 382). They thus recommend that training begin with shorter scripts/shorter sessions, with the duration gradually increased as the imaginer improves.[16] Relatedly, athletes might be instructed to break down the target scenario into smaller parts and then to reassemble the parts together in imagination (see Rodgers et al. 1991, 122).

In addition to being personalized for the individual athlete with respect to length, scripts are typically also highly personalized for individual athletes in other ways. Perhaps most obviously, the scripts are tailored to a specific sport and then, even more fine-grainedly, to a specific situation encountered by an athlete participating in that sport. But the scripts are also tailored for an athlete's personal performance goals and what they are deliberately working to improve. For example, one script might aim to help an athlete develop a positive mindset when heading into a competition, while a different script might aim to help an athlete relax. The scripts are also highly detailed – often including prompts that facilitate imaginings across several different sensory modalities. Consider, for example, this excerpt of a script developed for the sport of curling:

> Picture yourself standing at the near end of your favourite sheet of ice at your home curling club. You are about to call **your skip's first shot** of the end and are standing behind the back line. <*PAUSE*> Feel the cool air against your face as you grip your broom and take a few steps towards the back line. <*PAUSE*> Hear the sounds of the other sheets; rocks sliding down the ice, skips calling line, rocks hitting each other

> as one is removed from the rings. <*PAUSE*> Push those noises into the background as you turn your attention back to your sheet of ice.
>
> It is the **4**th **end** of a ten end game. You are shooting yellow rocks and the score is **4–3 (you are up 1 point)**. <*PAUSE*> **You have last rock in this end** and have chosen to play **offensively**, which means you want to play this end aggressively, and have a lot of rocks in play. <*PAUSE*> As you look down to the other end of the sheet, you see that your **skip** is settled in the hack, ready to throw their **first rock** of the end. <*PAUSE*> See your sweepers at the other end of the sheet, preparing to brush your **skip's first stone**. <*PAUSE*>[17]

The use of these scripts in imagination training highlights an important difference between imagination training and memory training. In the instances of memory training that we've been considering, individuals are often left to develop their own mnemonics – their own scripts, as it were. Even if they are given details about how a mnemonic system might be developed, as was the case with DD, they are left to work out the details on their own. They are thus largely self-trained. In contrast, in the instances of imagination training that we've been considering, individuals are provided with these detailed scripts by their trainers.

But there's another difference that has undoubtedly already occurred to many readers – one that seems potentially to run considerably deeper. While individuals engaged in memory training can get direct and fairly immediate feedback on how they are doing – they can be told whether and to what extent they have recalled things accurately – it is harder to see how individuals engaged in imagination can get comparable feedback. Relatedly, it is harder to assess imaginative improvement. We will take up these differences in more detail in the next section when we consider what the discussion of these types of training teaches us about the nature of memory and imagination and how they might be connected. Before we do so, however, I want to spend a moment thinking about how these difficulties have been addressed by researchers working on imagination training.

In fact, the difficulty of assessing improvement with respect to imagination is a matter of explicit discussion in the empirical literature on imagery training. For example, Cumming and Williams note that "because imagery can only be observed by the person performing it and not by others, measuring an individual's imagery ability is not a simple process" (Cumming and Williams 2012, 223). In a similar vein, Cumming and Eaves note that the covertness of the imagery process presents a challenge for researchers' ability to "measure imagery ability in a valid and reliable way" (2018, 381). Despite this challenge, however, researchers have developed various measurement tools, the majority of which involve self-report questionnaires, that are thought to "meet researchers' needs" (Cumming and Williams 2012, 223).[18]

Even so, much of the empirical research concerning imagination training seems to have focused more on assessing the effect that imagination has

on the improvement of athletic performance than on the improvement of imagination itself, and researchers note that more attention needs to be paid to this latter question.[19] That said, there have been some important exceptions – i.e., studies where the improvement of imagination was a central concern. Consider, for example, a study led by Wendy Rodgers that examined imagination training among a group of young figure skaters around the age of 13 (Rodgers et al. 1991). The skaters were divided into two groups, one that was trained in imagination techniques and one that was trained in verbalization techniques. The training consisted of two 15-minute individual sessions a week for 12 weeks (spread over a 16-week period). At the conclusion of 16 weeks, skaters in both training groups "attempted and passed more skating tests than would normally be expected" (Rodgers et al. 1991, 109), but the researchers did not take the results to be conclusive about the effectiveness of these techniques in improving figure skating skill. Where the study did yield strong results, however, was with respect to the improvement of imaginative skill. To measure this, two self-report questionnaires were used: the Movement Imagery Questionnaire, which measures individual differences in movement imagery, and the Imagery Use Questionnaire, which measures both visual and kinesthetic movement imagery. The evidence showed that the skaters who received imagery training improved their ability to produce and use certain types of visual movement imagery, and they also had an easier time visualizing various aspects of their skating performance when compared to skaters in the verbalization group.

3 Drawing Connections

Having looked more closely at both memory training and imagination training, we are now well-positioned to try to draw out some morals from the discussion. Interestingly, perhaps the most obvious moral is a negative one. Granted, as noted earlier, the type of memory involved in memory training is not the type of memory most directly analogous to the type of imagination involved in imagination training. But this disanalogy notwithstanding, when turning to the empirical literature treating memory and imagination as skills, one might have reasonably hoped that it would reflect and reinforce the similarity between memory and imagination that we noted at the start of this chapter. As has become clear, that is not what we've found. Sure, we can identify some commonalities between memory training and imagination training. For example, in both cases, we've seen the importance of regular practice. In both cases, we've also seen the usefulness of breaking down the relevant task into smaller subtasks. Someone working to train their memory benefits from dividing long series of numbers into smaller chunks; someone working to train their imagination benefits from dividing complex scenarios into smaller parts. And in both cases, we've seen the importance of personalization – whether it be via an individualized

mnemonic or by an individualized training script. But none of these commonalities seems to derive from anything special about memory and imagination, or their similarity. Rather, these commonalities seem highly likely to be shared by many other skills as well, both mental and physical.

In fact, the differences between memory training and imagination training seem more striking than the similarities. Let's return to two of these differences that we briefly mentioned earlier. First, while memory training techniques seem to be largely self-developed, imagination training techniques do not. In imagination training, the scripts are supplied by others. To some extent, this difference might be an artifact of the specific contexts of memory training and imagination training that we have been looking at (e.g., memory span tests and athletic performance). There are instances of various "expert" imaginers who seem to be largely self-trained, for example, the inventor Nikola Tesla.[20] In his autobiography, Tesla describes at length the imagination training exercises that he designed for himself as a child. But folks like Tesla aside, it does seem undeniable that the more formal instances of imagination training are guided by external aids in a way that formal memory training is not. In fact, we find the use of scripts in other contexts of imagination training besides athletics – in the guided visualization exercises employed in meditation, for example.[21] And even in much less formal instances of imagination training, we see elements that are strikingly analogous to scripts. Perhaps the most obvious way that someone might try to train their imagination informally would be to engage with literature, a process that might not be as deliberate or formal as an athlete working with a script but still looks to be pretty similar to it.[22] Another example might come from games of pretence, where pretenders jointly develop a quasi-script of sorts for their pretend exercise. In contrast, though individuals involved in memory training might be given instructions for how to develop a mnemonic (as happened with DD), the details of it are left to them to fill in and individualize for themselves.

The second difference we noted earlier concerns the availability of feedback. In memory training, individuals can get direct and fairly immediate feedback on how well they are doing – i.e., on the accuracy of their recall. In imagination training, comparable feedback does not seem to be possible. Of course, there are ways that individuals involved in imagination can be helped by their trainers.[23] For example, an individual might report on what they had trouble with in a particular imagination exercise, or what they think went wrong, and the trainer might provide feedback on how to do better the next time. But the trainer does not provide feedback on *how they did*; the feedback only comes into play after the success (or lack thereof) of their imaginative attempt has been self-assessed. Perhaps we could find some creative ways to impose some other kind of external check of an imaginer's success. For example, after working through an imaginative exercise, an imaginer in training might report on what they in fact imagined. If the trainer knows what was supposed to be imagined, what

the script was, then the trainer might be able to provide some feedback on how the imaginer did. But this still seems to be feedback of a different type from what is possible in the memory training case.

Unfortunately, then, initial consideration of the regimens involved in memory training and imagination training does not really point us towards new insight into the relationship between these two mental activities. But fortunately, this is not where the story ends. For I do think that our discussion of memory training – and in particular, our discussion of one of the main findings suggested by Chase and Ericsson – points us towards something interesting. As we saw earlier, Chase and Ericsson highlight the development of organized and easily accessed knowledge structures as playing a key role in skilled memory (Chase and Ericsson 1981, 159). It turns out, however, that these knowledge structures are often best represented *imagistically* – and exploring this point will lead us to an important finding about the relationship between memory and imagination.

It's at this point that the method of loci, the memory technique dating back to Simonides, comes in. No longer an arcane notion, the method of loci – now more commonly referred to as the *memory palace* technique – has played a high-profile role in several works of popular culture over the course of the last couple of decades. It was a central element of Thomas Harris's *Hannibal*, a book published in 1999 that follows the adventures of the infamous Hannibal Lecter after the events depicted in *Silence of the Lambs*. It also plays a role in *Sherlock*, a BBC series of the 2010s starring Benedict Cumberbatch as Sherlock Holmes. In this series, Holmes is shown utilizing a memory palace and mentally wandering through its rooms in an effort to solve various problems with which he is confronted. And memory palaces also feature prominently in Joshua Foer's bestselling book, *Moonwalking with Einstein* (2012), an account of the year he spent on a quest to improve his own memory, a quest that ended with his victory at the 2006 US Memory Championship.

Let's flesh out in more detail how this technique works. One starts with a location with which one is extremely familiar. One then populates that location, one's palace, with images that represent the items that one is trying to remember. As noted by Chase and Ericsson, a knowledge structure works best in the service of memory when its component parts are interactive, concrete, and elaborated. This is well exemplified by Foer's descriptions of some of the images he used in the service of memorizing randomized decks of playing cards. Having decided to represent the king of hearts as Michael Jackson moonwalking with a white glove, the king of clubs as John Goodman eating a hamburger, and the king of diamonds as Bill Clinton smoking a cigar, he notes that memorizing the king of hearts, king of clubs, and king of diamonds in order would involve an image of Michael Jackson eating a cigar (Foer 2012, 166).

Mental imagery also plays an essential role in other common techniques for memorization – and in very similar ways to the ones we have already

discussed. To take just one other example, consider the Dominic System. This technique was developed by Dominic O'Brien, a memory expert who won the world memory championships eight times. Though I don't have the space here to describe the system in great detail, its basic contours are easy to understand. In short, it enables one to memorize a sequence of numbers by converting two digits at a time into pairs of letters, associating those letters with people engaged in various actions, and then building them into a story that carries across the entire sequence of numbers. Here, too, the images should be interactive, concrete, and elaborated – not just an image of Charlie Chaplin, for example, but an image of Charlie Chaplin swinging a cane.

Ultimately, then what we see is that memory training and imagination training end up being mutually reinforcing. When the knowledge structures are based on images, as in the method of loci or the Dominic System, memory training ends up providing a kind of imagination training as well. As one works to improve one's memory, one will naturally be improving one's imagination as part of the process. On the flip side, insofar as being more highly skilled at imagination will facilitate the building of the kinds of knowledge structures essential for highly skilled memory, imagination training will enhance one's ability to train one's memory. In fact, Foer remarks on this very point in the course of recounting his own journey through memory training. In his view, the distinguishing feature of a great mnemonist is the ability to create "lavish images on the fly, to paint in the mind a scene so unlike any that has been seen before that it cannot be forgotten. And to do it quickly" (Foer 2012, 100).

Perhaps it would be too strong to say that memory training and imagination training are *always* mutually reinforcing. SF and DD, after all, did not appear to use imagistically-based knowledge structures. But I'm tempted by the thought that there might be mutual reinforcement even in these cases. Might even their systems have been imagination-based? For example, when treating the sequence 897 as "89.7 years old, a very old man," might SF have produced a mental image of this old man? Though I don't see any evidence one way or another in the reports of the memory study, it strikes me as plausible that he might have – or, at least, that a hypothetical individual using that kind of mnemonic system would naturally use images in their coding. Moreover, though my focus throughout this discussion has been on sensory and experiential imagination, it might be that SF's treatment of sequences of numbers as running times could be seen as involving propositional imagination. When representing 3,492 as "three forty-nine point two, near world-record mile time," perhaps what he's doing is imagining that someone is running the mile in three forty-nine point two, near world-record mile time. Again, however, I don't see any evidence one way or another in the reports of the memory study, so these remarks have to be taken as highly speculative.

Rather than end on such a speculative remark, however, I'll instead return to the questions that motivated this discussion before I close. Do we

learn something about the nature of the activities of memory and imagination from looking at how they can be trained? In particular, does looking at how they can be trained help us to better understand the similarity of these two different activities? To my mind, the answer to these questions is best cast as a qualified yes. Insofar as we might have been aiming to settle the issue of continuism – the issue of whether memory and imagination are best seen on a continuum – I don't think our hopes will have been met. But cast this way, our aim was surely too ambitious. And insofar as we had a slightly less ambitious aim in mind, I think the discussion will indeed have advanced our understanding of issues at the intersection of memory and skill.

Granted, the kind of training on which we focused did not involve episodic memory, the kind of memory that is most directly analogous to the kind of imagination that features in discussion of imagination training. But, as we've noted, there has been comparatively little attention focused on episodic memory training. And that raises several interesting questions in and of itself. Does the lack of attention to episodic memory training suggest that it's not the kind of activity that can be trained? If so, that might raise problems for the treatment of episodic memory as a skill – and that in turn might lead to some important insights about continuism. Or does this simply just suggest that more work needs to be done. For example, might the techniques involved in imagination training be employed for use in training episodic memory? And might there be ways to deliberately exploit the mutually enforcing nature of memory and imagination training so as to produce greater skill gains in both of these domains? As all these questions suggest, the reflections of this chapter have laid some important groundwork for future inquiries – both empirical and philosophical – in this area.[24]

Notes

1 See Hume (1739/1985), *Treatise* 1.1.3.
2 See, e. g., Hassabis et al. (2007). On the basis of fMRI studies, they suggest that "a distributed brain network, including the hippocampus, is recruited during both episodic memory recall and the visualization of fictitious experiences" (2007, 14373).
3 See, e. g., Michaelian (2016).
4 For a nice discussion of the great variety of activities that are generally recognized as skills, see Fridland (2014, 79).
5 That said, though I take the list to lay out three central features of skilled activities, I don't take it t to provide a set of necessary and sufficient conditions for skill.
6 See Kind (2020) for further argument as to why imagination should be treated as a skill. For a philosophical discussion of memory treated as a skill, see Michaelian (forthcoming).
7 For further examples of his workarounds, see Chase and Ericsson (1981, 154).
8 Feng Wang's memory techniques were studied by Ericsson and his team; see Ericsson et al. (2017).

9 A compendium of statistics on various memory tasks is available at http://www.world-memory-statistics.co.uk/home.php.
10 Text available at https://penelope.uchicago.edu/Thayer/E/Roman/Texts/Rhetorica_ad_Herennium/3*.html.
11 For some empirical discussions that treat episodic memory as a skill, see Hayne and Imuta (2011) and Brehmer et al. (2008).
12 See https://www.golfwrx.com/140719/use-visualization-imagery-like-many-of-golfs-greats/.
13 I attempt to tackle this question directly in Kind (2022).
14 See Cumming and Eaves (2018, 377), for discussion of these processes.
15 In Kind (2017), I express reservations about the utility of the notion of vividness, but I here put those reservations aside.
16 For similar recommendations and further discussion, see Williams et al. (2013, 112).
17 Emphasis in original. I am grateful to researcher Craig R. Hall for providing me with a copy of this script. To the best of my knowledge, it has not been published. For examples of other sample imagery training scripts, see Williams et al. (2013, Appendix A).
18 Cumming and Eaves agree with this assessment: "Both subjective and objective measurement approaches are available. Subjective methods involve gathering information about explicit imagery experiences using questionnaires, interviews, or other self-report methods, whereas objective measures can tap imagery more implicitly using behavioral, physiological, or neural measures" (Cumming and Eaves 2018, 381).
19 See also Cumming and Williams' claim that "surprisingly little attention has been paid to how imagery ability is effectively developed" (2012, 224).
20 I discuss Tesla and his expertise at imagining in Kind (2018).
21 See Kind (2022) for an example of this.
22 I discuss how one might cultivate one's imagination by way of literature in Kind (forthcoming).
23 They might also be able to get feedback in other ways. In many cases, self-feedback will be possible. For example, a bobsledder who is imagining the track may in many cases be able to go look at the track itself and see how well the imaginative exercise matches up to the sensory experience. Thanks to Anja Berninger for this point.
24 A previous version of this chapter was presented at the Center for Philosophy of Memory in their internal seminar. I am grateful to the participants there for their helpful feedback. I am also grateful for comments from Anja Berninger and Íngrid Vendrell Ferran. Finally, many thanks to my research assistant, Julia Garbee, for her invaluable help with background research for this chapter.

References

Brehmer, Y, S. C. Li et al. 2008. Comparing Memory Skill Maintenance Across the Life Span: Preservation in Adults, *Increase in Children. Psychology and Aging* 23(2): 227–38.

Chase, W.G., and K. A. Ericsson. 1981. Skilled Memory. In *Cognitive Skills and Their Acquisition*, ed. John R. Anderson 141–89. Hillsdale, NJ: Erlbaum.

Cumming, Jennifer, and Daniel L. Eaves. 2018. The Nature, Measurement, and Development of Imagery Ability, *Imagination, Cognition, and Personality* 37(4): 375–93.

Cumming, Jennifer, and Sarah E. Williams. 2012. The Role of Imagery in Performance. In *The Oxford Handbook of Sport and Performance Psychology*, ed. Shane E. Murphy. Oxford: Oxford University Press. doi:10.1093/oxfordhb/9780199731763.013.0011

Ericsson, K. A., W. G. Chase, and S. Faloon. 1980. Acquisition of a Memory Skill. *Science* 208: 1181–2.

Ericsson, K. A. et al. 2017. Memory Skills Mediating Superior Memory in a World-Class Memorist. *Memory*. Available online at http://dx.doi.org/10.1080/09658211.2017.1296164

Foer, J. 2012. *Moonwalking with Einstein*. New York: Penguin Books.

Fridland, E. 2014. Skill Learning and Conceptual Thought: Making Our Way Through the Wilderness. In *Contemporary Philosophical Naturalism and Its Implications*, eds. B. Bashour and H. Muller, 77–100. New York: Routledge.

George, L. 1982. Enhancement of Psi Functioning Through Mental Imagery Training. *The Journal of Parapsychology* 46: 111–26.

Hall, C. R., W. M. Rodgers, and K. A. Barr. 1990. The Use of Imagery by Athletes in Selected Sports. *The Sports Psychologist* 4: 1–10.

Hassabis, D., D. Kumaran, and E. A. Maguire. 2007. Using Imagination to Understand the Neural Basis of Episodic Memory. *The Journal of Neuroscience* 27(52): 14365–74.

Hayne, H., and K. Imuta. 2011. Episodic Memory in 3- and 4-Year Old Children. *Developmental Psychology* 53(3): 317–22.

Hume, D. 1739/1985. *A Treatise of Human Nature*. ed. P.H. Nidditch. Oxford: Oxford University Press.

Kind, A. 2017. Imaginative Vividness. *Journal of the American Philosophical Association* 3: 32–50.

Kind, A. 2020. The Skill of Imagination. In *The Routledge Handbook of Philosophy of Skill and Expertise*, eds. E. Fridland and C. Pavese, 335–46. London and New York: Routledge.

Kind, A. 2022. Learning to Imagine. *British Journal of Aesthetics* 62: 33–48. https://doi.org/10.1093/aesthj/ayab037

Kind, A. Forthcoming. Fiction and the Cultivation of Imagination. In *Philosophy of Fiction: Imagination and Cognition*, ed. Patrik Engisch and Julia Langkau.

Kind, A., and P. Kung. 2016. Introduction. The Puzzle of Imaginative Use. In *Knowledge Through Imagination*, eds. A. Kind and P. Kung, 1–37. Oxford: Oxford University Press.

Kind, Amy. 2018. How Imagination Gives Rise to Knowledge. In *Perceptual Memory and Perceptual Presence*, eds. Fabian Dorsch and Fiona Macpherson, 227–46. Oxford: Oxford University Press.

Leport, A. R., S. M. Stark, J. L. McGaugh, and C. E. L. Strak. 2016. Highly Superior Autobiographical Memory: Quality and Quantity of Retention Over Time. *Frontiers in Psychology* 6: 1–10.

Liao, S., and T. Gendler. 2019. Imagination. *The Stanford Encyclopedia of Philosophy* (Summer 2020 Edition), Edward N. Zalta, ed. https://plato.stanford.edu/archives/sum2020/entries/imagination/

Michaelian, K. 2016. *Mental Time Travel Episodic Memory and Our Knowledge of the Personal Past*. Cambridge, MA: MIT Press.

Michaelian, K. Forthcoming. Imagining the Past Reliably and Unreliably: Towards a Virtue Theory of Memory. *Synthese*. https://doi.org/10.1007/s11229-021-03125-4

Noll, R. 1985. Mental Imagery Cultivation as a Cultural Phenomenon: The Role of Visions in Shamanism. *Current Anthropology* 26: 443–61.

Rodgers, W., C. Hall, and E. Buckolz. 1991. The Effect of an Imagery Training Program on Imagery Ability, Imagery Use, and Figure Skating Performance. *Journal of Applied Sport Psychology* 3: 109–25.

Squire, L. R. 2009. Memory and Brain Systems: 1969–2009. *The Journal of Neuroscience* 29(41): 12711–16.

Stanley, J., and J. Krakauer. 2013. Motor Skill Depends on Knowledge of Facts. *Frontiers in Human Neuroscience* 7: 1–11.

Staszewksi, J. 1990. Exceptional Memory: The Influence of Practice and Knowledge on the Development of Elaborative Encoding Strategies. In *Interactions Among Aptitudes, Strategies, and Knowledge in Cognitive Performance*, eds. W. Schneider and F. E. Weinart, 252–85. New York: Springer-Verlag.

Tusek, D., J. Church, and V. Fazio. 1997. Guided Imagery as a Coping Strategy for Perioperative Patients. *AORN Journal* 66(4): 644–9.

White, A, and L. Hardy. 1998. An In-Depth Analysis of the Uses of Imagery by High-Level Slalom Canoeists and Artistic Gymnasts. *The Sport Psychologist* 12 (4): 387–403.

Williams, S. E. et al. 2013. Seeing the Difference: Developing Effective Imagery Scripts for Athletes. *Journal of Sports Psychology in Action* 4: 109–21.