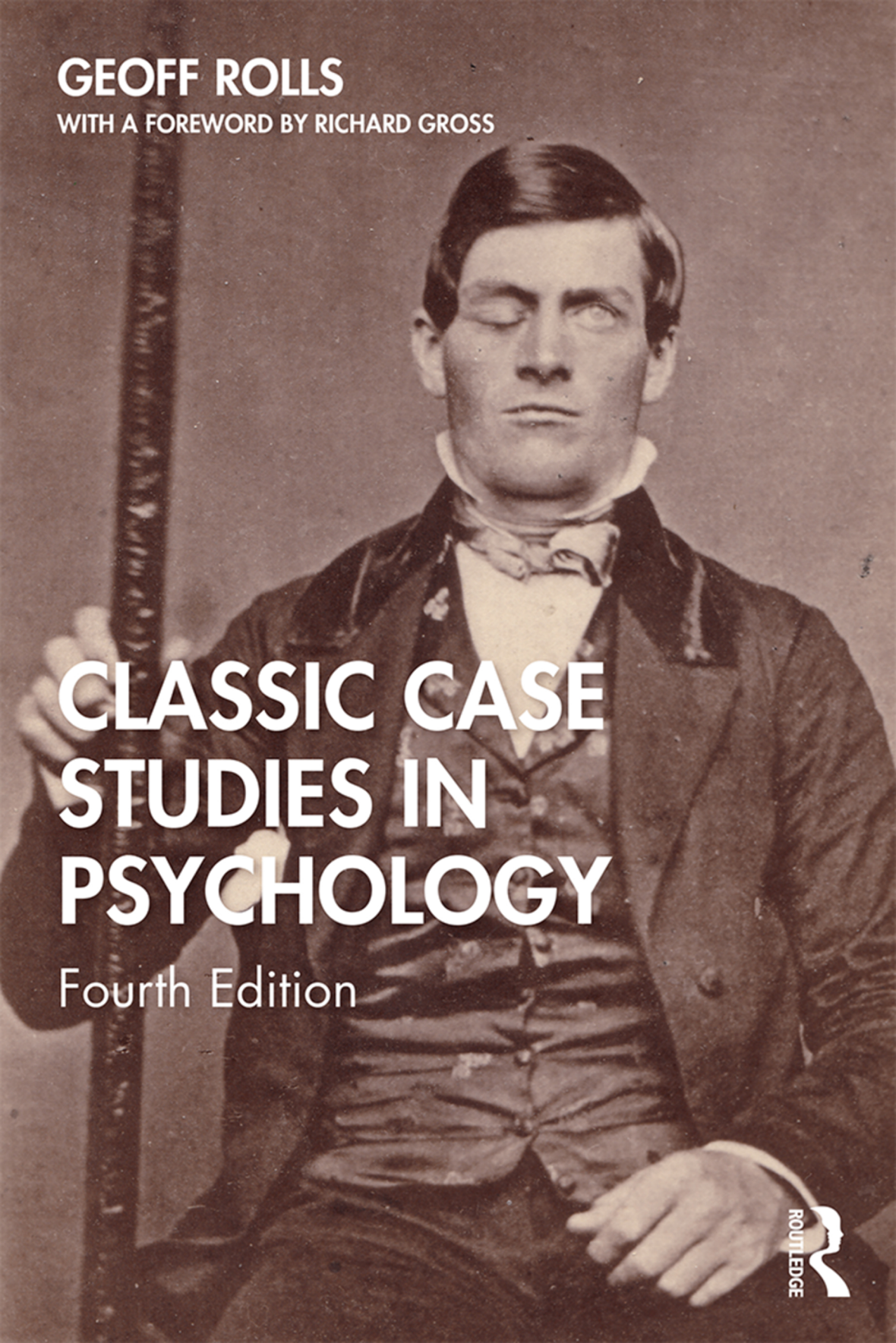
GEOFF ROLLS
WITH A FOREWORD BY RICHARD GROSS



CLASSIC CASE STUDIES IN PSYCHOLOGY

Fourth Edition

ROUTLEDGE

Classic Case Studies in Psychology

This new edition of *Classic Case Studies* is the essential selection of case studies and stories that illustrate not only many of the most fundamental tenets of psychology, but also some of the most extreme forms of human behaviour.

The human mind is both extraordinary and compelling. From the leader who convinced his followers to kill themselves to the man who lost his memory, these famous accounts have provided invaluable insights for scholars and researchers and amazed the public at large. Brought to life by Rolls, each case is contextualised with more typical behaviour, while the latest thinking in each subfield is also discussed. Revised and updated, the new edition features two new case studies, including the 'Jim twins' by Thomas Bouchard, an amazing case of twins separated at birth and adopted by different parents, yet when reunited 30 years later shared so many behavioural characteristics.

Also featuring a new chapter on approaches, issues and debates, accessibly written and requiring no prior knowledge of psychology, this book is essential reading for A-level students and undergraduates alike.

Geoff Rolls has taught psychology for over 26 years and is currently Head of Psychology at Peter Symonds College, Winchester. He is the author of the popular *Women Can't Park, Men Can't Pack* (Chambers, 2009), which investigates gender stereotypes (including driving), and also *Taking the Proverbial* (Chambers, 2007), which explores the psychological truth behind well-known proverbs and sayings.

Classic Case Studies in Psychology

Fourth Edition

Geoff Rolls

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For Eve and our children,
Billy and Ella.

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Foreword to the fourth edition

Psychology is commonly defined as 'the scientific study of mind and behaviour' and has, traditionally, modelled itself on the natural sciences (especially physics and chemistry). But not everyone agrees about what 'science' entails, let alone about the validity of trying to study 'mind and behaviour' using methods 'borrowed' from physics and chemistry.

The method that is often taken as distinguishing science from, say, philosophy, is the laboratory experiment; for many 'hard-nosed' scientists, this is the 'method of choice'. Why? Because it allows another researcher to repeat or replicate the study in order to test the reliability and validity of the original findings. In turn, this helps determine general laws or principles, the so-called *nomothetic* approach.

By contrast, case studies, by definition, cannot be replicated. This is because they involve the in-depth investigation of an individual, a pair of individuals (such as twins) or an entire family – rather than groups of 'interchangeable' participants. They illustrate the *idiographic* approach; the study of *unique* individuals: it's their uniqueness that is the focus of study.

Traditionally, the nomothetic and idiographic approaches have been regarded as polar opposites in terms of their scientific value: because only experiments can be replicated and contribute to the formulation of general laws/principles, case studies have been dismissed as 'interesting' but of little importance. This view has been reinforced by the fact that case studies are often derived from the work of *clinicians* (psychologists, psychiatrists or others who work with people experiencing mental disorders or who display highly unusual cognitive abilities or behaviour). In all of these cases, the case study is a spin-off, a usually unexpected outcome of their work, whereas experiments are designed to test specific hypotheses (another feature that makes them 'scientific').

However, not only is the nomothetic/idiographic distinction a false dichotomy, but it is precisely the uniqueness and novelty of the individuals who become the subject matter of case studies that makes them invaluable in our attempt to understand the human mind – and, hence, ourselves. Conversely, however 'unique' such individuals may be, they're always recognisably human – not some fascinating alien species but, ultimately, not so different from the rest of us that we cannot see aspects of our 'normal' selves in its abnormal – sometimes bizarre – behaviour.

This is perhaps the crucial point. The fact that some other psychologist cannot repeat the case study doesn't invalidate it. On the contrary, the behaviour is likely to be merely an exaggeration or distortion of more commonplace ('normal') behaviour – it's drawn from the same 'pool'.

As much like novels as reports of scientific investigations, case studies focus on the details that make human beings so fascinating and complex. They tell a 'story' that isn't just inherently interesting, puzzling and sometimes amusing, but that is also informative about all of us. What makes a case study 'science' rather than literature is that the psychologist or psychiatrist explicitly links the story to some scientific theory or body of research findings, which represent formal, objective attempts to understand and explain the behaviour. Just like experiments, case studies are intended to contribute to our scientific understanding.

Geoff Rolls, as a psychology teacher and author, reflects these various aspects of the case study in this unique and extremely well-written book. He has selected a number of studies that many non-psychologists will probably have some knowledge of. Between them, the studies sample an enormously wide range of human behaviours, both 'abnormal' and merely unusual or exceptional.

One welcome addition to this fourth edition is the case of Lynndie England, the US Army reservist who was sentenced to three years in prison for her part in the torture and abuse of detainees at the Abu Ghraib prison in Iraq following the fall of Saddam Hussein. Her case is discussed in the context of one of psychology's most infamous studies, the Stamford Prison Experiment (SPE), led by Philip Zimbardo.

A second important addition is the less well-known case of twin boys (the 'Jim twins'), who'd been adopted separately shortly after birth and who met for the first time at the age of 41. The striking similarities – both physical and behavioural – between the two Jims has been found in many other separated twin pairs, suggesting the major role of 'nature' (i.e. genetic influences) relative to 'nurture (i.e. environmental influences). However, these twin studies have

themselves been criticised and the conclusions that can be drawn from them are far from straightforward.

The controversy over nature and nurture has been a feature of debate within psychology for much of its history, as have a number of other theoretical approaches and conceptual issues. In a new, concluding chapter, Geoff summarises some of these, namely, nature versus nurture, ethics, idiographic versus nomothetic approaches, free will and determinism, reductionism and holism and gender and cultural bias. It also includes a very useful table, which indicates how each of the 24 case studies belongs to one of the traditional areas of psychology, namely, biological, cognitive, social, behavioural and psychodynamic.

These issues and debates are, in turn, applied to the 24 case studies, representing a way of evaluating them and providing a broader understanding. While just as accessible as the individual case studies, discussion of these issues and debates should enhance the experience of all interested readers (not just psychology students).

Each chapter is a summary of the original case study (as reported in a book or academic journal or newspaper), and Geoff's ability to condense huge amounts of information into a single chapter and still tell a good 'story' is an achievement in itself. But, as indicated above, he also weaves into the story the theory and related research that makes these case studies 'science'.

He has done this, I believe, in such a way that both the general reader and the psychology student will learn something about human behaviour they didn't know before – regardless of any prior familiarity with the case study. Both will, I'm sure, also be intrigued and entertained by the 'stories' Geoff has to tell.

Richard Gross, July 2019

Acknowledgements

Writing can be a very solitary exercise but it is only really made possible with a lot of help. I would like to thank all those people who have worked or contributed to this fourth edition of *Classic Case Studies in Psychology*.

First and foremost Eve Murphy is my keenest supporter and continually helps me with the ideas for chapters and has never once refused to read and reread yet another chapter. My children Billy and Ella have always supported me with the writing and Ella even allowed me to use her laptop for editing purposes. I would never have completed this book without their help. Thank you for everything you do for me.

Richard Gross contributed the Foreword to this edition yet again. Richard is not only the best academic psychology writer in the UK he is also one of the nicest people I have met in my professional life and I am grateful to be able to call him a friend. He has helped me in so many ways in my writing career and with his modest personality will never realise the debt I owe him.

There is always a great support team behind any book and it is such a shame that they only get a very small acknowledgement. I would like to thank Ellie Jarvis and Laurie Fuller the production editors, Kelly Derrick the meticulous and professional copy-editor and Alex Howard who was the first person to enthusiastically promote the idea of a fourth edition. Thank you one and all.

There is a quote in the book from Isaac Newton that reads: 'If I have seen further, it is by standing upon the shoulders of giants', and writing the book and re-editing it I felt a sense of gratitude and wonderment to all the people who featured in the case studies. Their stories filled me with a sense of awe for

what humans can achieve often in the face of extreme adversity. I hope their stories can inspire us all. I would like to acknowledge and salute the lives of every one of the individuals documented in the book and the many authors who have helped document their lives. Their stories enrich our own. Writing about their lives made me feel very humble and their lives provide a lesson for all of us.

Abbreviations

ASL	American Sign Language
CBT	cognitive behaviour therapy
CSF	cerebrospinal fluid
DID	dissociative identity disorder
EEG	electroencephalogram
EWT	eyewitness testimony
GSR	galvanic skin response
LAD	language acquisition device
LTM	long-term memory
MPD	multiple personality disorder
OCD	obsessive-compulsive disorder
PET	positron emission tomography
PTSD	post-traumatic stress disorder
REM	rapid eye movement
STM	short-term memory
SWS	slow-wave sleep

Introduction

This is a strange book full of even stranger stories. Psychology is a fascinating subject with many fascinating stories to tell. But the most fascinating stories are told by case studies. They range from stories of people with no memory to stories of people who can't forget. Stories of wild, abandoned children to stories of child prodigies. Without doubt, these are the most interesting aspects of psychology.

They can also be the most revealing in terms of furthering our understanding of human behaviour. The problem is, we all want to know more than is available in the textbooks. Scientific journals concentrate on the scientific aspects when we also want to know what happened on an everyday, human level. What was it like to do that? What was it like for the individuals concerned? How did they feel? How did they cope? What happened next? This book tries to bridge that gap.

Important findings in psychology have often been discovered first through one-off case studies. Such case studies always fascinate both the psychology student and the lay reader alike. The use of the case study method helps bring psychology to life – it puts a human angle to psychological ideas.

Psychologists continue to argue about the scientific status of psychology. There is little doubt that scientific findings tend to be given greater credence than hearsay or subjective experiences. However, when it comes to the human mind and behaviour, it can be difficult to conduct scientifically controlled experiments that don't break ethical and moral boundaries. This is where the use of case studies can be particularly useful. They enable the scientist to investigate avenues of the mind and behaviour that are not ordinarily available. By exploring the extraordinary we can learn much about the ordinary.

The use of the case study method in psychology has a long tradition. Indeed, it is one of the very earliest methods and Itard's first report on the 'Enfant Sauvage' dates back to 1801 (see Chapter 9). In recent years, there have been numerous books giving unique insights into people's unusual deficits or excesses. However, these books tend to be written by neurologists and the case studies relate to patients they have met during their medical careers. This book is different in that it provides more detail on the most famous case studies in psychology – the studies that are in many of the psychology textbooks. Of course, entire books and numerous papers have been written about some of the more famous ones, but here, each chapter is condensed into a more easily digestible 'chunk' dealing with the most interesting and revealing aspects of each case. In addition to the scientific importance of each case study, the human aspect of each person's experience is included. The hope is that we will begin to understand the people presented in the case studies as humans with a unique ability or difficulty rather than merely as 'scientific case studies'.

Professor Luria, who worked at the Moscow State University, outlined two contrasting approaches to the study of human behaviour. These he called 'classical' and 'romantic' science. Classical science has the aim of formulating 'abstract general laws', which can result in the 'reduction of living reality with all its richness of detail to abstract schema'. He noted that this has become more and more pronounced with the advent of computers in that observations can now be reduced to complex mathematical analysis. This book seeks to adopt the so-called 'romantic' or literary science view. The stories have a scientific point and help to illustrate areas of psychology but are written from a human viewpoint. They are *human* stories.

Case studies are used extensively in law, business and medicine, but their use is less common in psychology. This is a shame since we often seem to remember the case studies most vividly because they help to humanise science as well as illustrating psychological findings.

A case study involves gathering detailed information about an individual or group. It will usually include biographical details as well as details of the behaviour or experiences of interest. Case studies allow a researcher to examine a particular individual in far greater depth than experimental methods of investigation. Case studies lend themselves to so-called qualitative research methods and thus findings are not easily reported in a numerical fashion. Written, descriptive reports are often used. These outline what the person feels or believes about a particular issue.[1] These methods tend to be criticised as

being less 'scientific' and less worthy than more rigorous experimental methods using statistical analysis.

An additional criticism levelled at case studies is that sometimes the researcher conducting the study may be biased in their interpretations or reporting method. This 'subjectivity' means that it could be difficult to determine factual information from researcher inference. An awareness of this does not detract from the stories that emerge. Indeed, much of the rich detail from the first-hand accounts would not have been possible had the researcher(s) not formed warm and friendly relationships with their participants. This might be viewed as a strength of the approach not a weakness.

Case studies can help shed light on both specific and general psychological issues. Case studies allow psychologists to study behaviours or experiences that are so unique that they could not have been studied in any other way. Examples in this book illustrate this. These case studies allow the researcher to explore possibilities in human behaviour that may not have been previously considered or thought possible. Often a case study can span several different areas of psychology. With this in mind, readers may argue about the grouping of the case studies into specific approaches. Does the David Reimer case cross from developmental psychology into both social and physiological psychology and perhaps even further? I will leave the reader to be the judge of this. Thus, these headings may be a little artificial but at least they illustrate how case studies are drawn from many different areas of psychology.

Bromley (1986) has argued that case studies are 'the bedrock of scientific investigation' and that psychologists' preoccupation with experimental procedures has led to a neglect of this area. Case studies have the advantage of providing greater depth and understanding about an individual and acknowledge and celebrate human diversity. Because case studies are about 'real, genuine people' they have a special feeling of truth about them. This helps to make them memorable. However, case studies are also criticised for being unreliable (no two case studies are alike) and therefore results cannot be easily generalised to other people. The question arises as to whether we always have to find out universal truths of behaviour. Sometimes surely, it's enough to explore the lives of a unique individual.

Students of psychology will recognise many of the stories but will want to know more. Those new to psychology will find it a useful and interesting introduction to the greatest mystery of all: understanding the human mind and human behaviour in all its facets.

Note

1 There are more quantitative methods for single case studies – these tend to be rather different to the 'naturally occurring originals' we are dealing with here.

Reference

Bromley, D.B. (1986). *The Case Study Method in Psychology and Related Disciplines*. Chichester, UK: John Wiley & Sons.

Part 1

Cognitive psychology

Chapter 1

The man who couldn't forget

The story of Solomon Shereshevsky ('S')[1]

One day in 1905, a 19-year-old Moscow newspaper reporter, called Solomon Shereshevsky, turned up for work as usual and waited for the daily meeting with the editor of the paper during which assignments for the day would be given out. Unlike any of his colleagues, but as was his usual practice, Solomon did not take any notes about the meeting. The editor had noticed this before with surprise and this time decided to reproach Solomon. After all, often there were numerous names and addresses given out and Solomon ought to record the details. The editor decided to test Solomon by asking for details of what he had said. Solomon proceeded to repeat all that he had been told word for word. This incident changed Solomon's life forever and was the starting point of his new career as the world's greatest mnemonist or 'memory man'.

Solomon's memory

The editor was amazed by Solomon's memory whereas Solomon was amazed that anyone should think his memory was remarkable. Didn't others have equally good memories? The answer he would discover over the coming months and years. Sensing an interesting story, the editor sent Solomon to the local university for some further tests of his memory ability and this is where he met Alexander Romanovich Luria, a Russian professor who was to spend the next 30 years systematically studying the most remarkable memory ever examined.

Luria started the examination by collecting biographical details. Solomon, a Latvian by birth, was in his late twenties, his father owned a bookstore and therefore, not surprisingly, his mother was well read. His father could apparently recall the location of every book in the store and his mother, a devout Jew,

could quote long paragraphs from the Torah. His brothers and sisters were well-balanced individuals and there was evidence of some musical talent within the family. Indeed, Solomon trained as a violinist until an ear infection put paid to that choice of profession and he turned to journalism instead. Given the suggested link between exceptional ability and mental illness, Luria noted no history of mental illness in the family.

Luria began by giving Solomon a series of tests to ascertain his memory capacity. Words and numbers were presented to him in spoken or written form and he had to replicate them in their original form. Luria started with 10 or 20 items but increased this gradually to 70 items. Solomon recalled all the items perfectly. Solomon occasionally hesitated with his answers, and stared into space, paused but then continued with the word-perfect recall.

Solomon could also report the letters or numbers in reverse order or determine which letter or number followed another in a sequence. This is known as a serial probe technique whereby a list of letters or numbers is read out and then one item is repeated and the item that follows has to be recalled. This can be conducted as a test of short-term memory (recall duration of up to about 30 seconds). Most people find this task extremely difficult especially with a long sequence of items but Solomon had no difficulty providing that the initial presentation of the list was at a pace that he dictated. This pace tended to be fairly slow, which is the exact opposite of so-called 'normal' participants who tend to perform slightly better on a serial probe task if the items are presented quickly. This is because with normal participants the quicker the presentation the less time the items have to decay in their short-term memory. However, with Solomon it was discovered that he was using a different system for remembering the items – not one based on normal acoustic or sound processing – but one that involved images or pictures. This also meant that once learned, Solomon would remember the sequence of items indefinitely, whereas most normal participants would have little recall for the items beyond the minutes that the experiment would take.

Luria began to present Solomon with different memory tasks. Most people find meaningful words far easier to recall than nonsense syllables or trigrams (three consonants with no meaning) but Solomon had no problem with any of them. The same findings occurred with sounds and numbers, all Solomon required was a three- or four-second delay between each item to be recalled. In order to test the capacity of memory, researchers have devised a technique developed originally by Joseph Jacobs in 1887 called the serial digit span technique. This involves gradually increasing the items to be remembered until

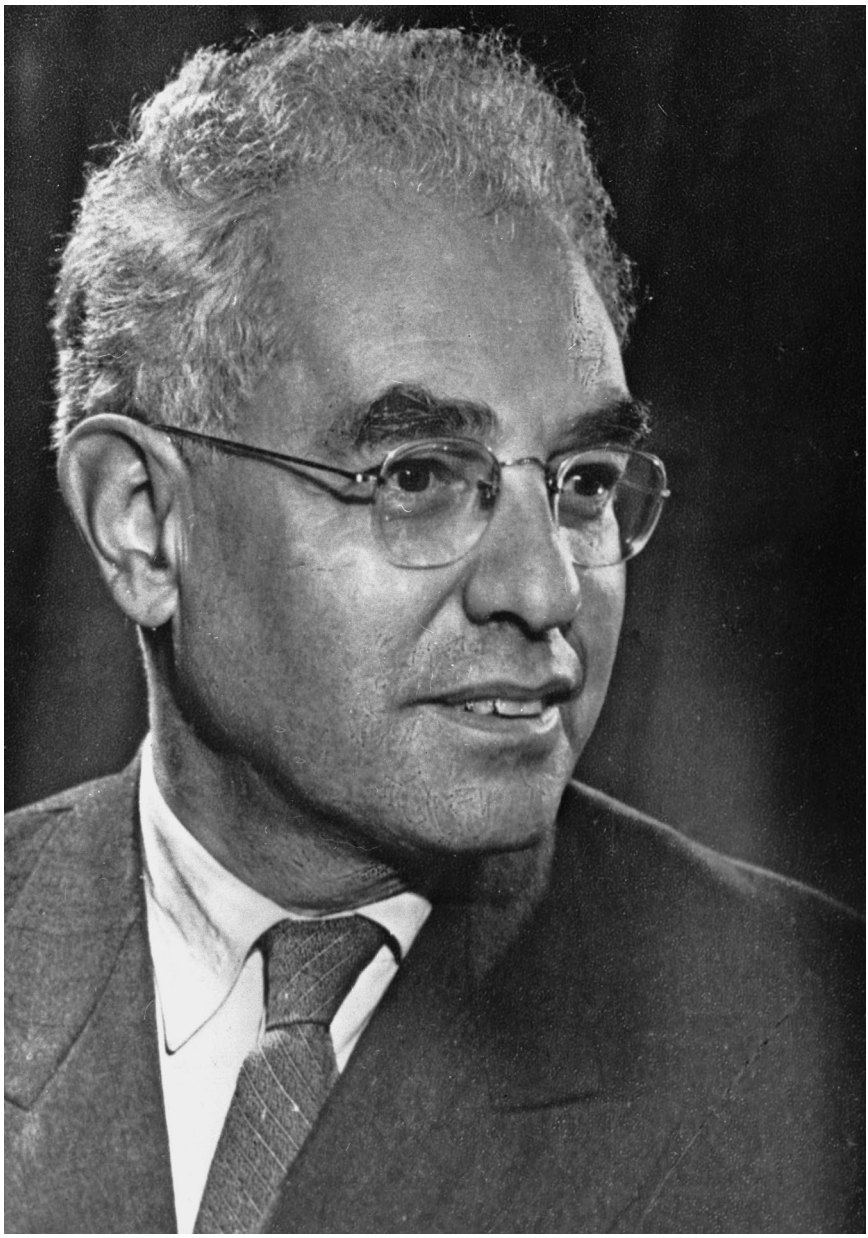

Figure 1.1 Professor Alexander Luria who studied Solomon Shereshevsky ('S') for decades

Source: © RIA Novosti/Alamy

the participant becomes confused and can no longer recall the items in the correct order. If you try this, you'll find that the typical digit span is seven plus or minus two items. However, with Solomon it was Luria who became confused since Solomon appeared to have no limit to his digit span! Indeed, Luria had to give up in the end since there appeared to be no limit to his memory capacity.

Luria arranged for Solomon to return to the university for further tests of his memory. At these sessions, Solomon could recall perfectly all the previous items he had learned. These results confused Luria even more, since Solomon seemed to have no limit either to the capacity of his memory or to the durability of the traces he retained. As Luria (1968)[2] writes:

> I soon found myself in a state verging on utter confusion. An increase in the length of a series led to no noticeable increase in difficulty for S., and I simply had to admit that the capacity of his memory had no distinct limits.
>
> (p. 11)

Luria couldn't measure either the capacity or duration of Solomon's memory, both of which can usually be tested fairly easily in a laboratory. Indeed, even more amazingly, Luria found out 16 years later that Solomon could recall the items learned at his original sessions. Luria reports Solomon saying:

> Yes, yes … This was a series you once gave me when we were in your apartment … You were sitting at the table and I in the rocking chair … You were wearing a gray suit and you looked at me like this … Now then I can see you saying …
>
> (p. 12)

This gives a clue as to how Solomon's memory worked – images were the key to his remarkable memory.

Luria had a problem. He realised that there was no way to measure Solomon's memory since it seemed to have no capacity limit. A quantitative analysis of his memory was impossible. For the next 30 years, he decided to concentrate on *describing* Solomon's memory: to provide a qualitative account of its structure.

Solomon used one particular mechanism to aid his memory. Regardless of the type of information or its form (words, numbers, sounds, tastes and so on) Solomon always converted these items into visual images. Providing Solomon was given the time to convert the items into images there was no limit to the capacity or duration of his memories. A table of 50 random numbers would

typically take him about three minutes to commit to memory. How was this done? Solomon stated that if numbers were written on paper, when asked to recall them later, he would recall the image he had of the paper and recall them as though he was still staring at it. If you were to stop reading now and try to report all that you could see if you glanced up from the page you would probably recall only a fraction of what you actually saw. For Solomon, his recall was as though he was still looking at the page! Solomon could still picture the page in his mind's eye in perfect detail.

Many memory tasks work on the basis of errors made during recall. Such memory experiments are called 'substitution error' studies. Mistakes that are made during recall often provide a clue as to how the memory works. It would be wrong to give the impression that Solomon never made any mistakes – they did not occur that often and they were usually of a similar type – and they give us a further clue as to how his memory worked. For example, Solomon occasionally misread one number for another, especially if the numbers appeared similar, i.e. 3 and 8 or 2 and 7. Such errors again suggested that his memory was almost exclusively dependent on visual or so-called orthographic processing.

When given a list of words or numbers to recall, 'normal' people often recall the first and last items on the list. Recall of the first items is called the 'primacy' effect and the last is called the 'recency' effect. This pattern of recall is known as the 'serial position effect'. It is suggested that the first words have been transferred to long-term memory through rehearsal and the last items on the list are still held in short-term memory. Once again, as with Solomon's duration and capacity of memory, Luria did not record this phenomenon, since Solomon could recall all the items wherever they appeared on a list!

Solomon had the most amazing memory. Indeed, he had memories dating back to childhood that few of us possess. It is suggested that our memories of our first few years aren't recalled because we haven't learned to encode the material due to a lack of development in terms of memory and/or speech. However, Solomon encoded his memories in a different way and since this ability was innate he possessed it at a very early age. Solomon reported memories from lying in his cot as an infant when his mother picked him up:

> I was very young then … not even a year old perhaps … What comes to mind most clearly is the furniture in the room … I remember that the wallpaper in the room was brown and the bed white … I can see my mother taking me in her arms.
>
> (p. 77)

He even recalls his smallpox vaccination: 'I remember a mass of fog, then of colours. I know this means there was noise, most likely conversation … But I don't feel any pain' (p. 78). Of course, it's impossible to discover the accuracy of these memories but their vividness certainly suggests an element of truth.

With such an amazing memory, Solomon was brilliant at spotting contradictions in stories, often pointing out things that the writers had failed to notice. He reports a character in the Chekhov story entitled 'Fat and Thin' who takes off his cap where earlier he is mentioned as having not worn a cap. Given his precise ability, one might have imagined Solomon becoming a detective or lawyer. Solomon could 'see' every detail and could not fail to spot any contradictions.

Synaesthesia

Luria reports that Solomon often had difficulty with encoding or processing information if there was a distraction during the encoding process. This included the experimenter merely saying 'Yes' or 'No' to indicate whether Solomon had heard an item correctly. Solomon reported that these words 'blurred' the image in his head and created 'puffs of steam' or 'splashes', which made it more difficult for him to see the items. Later, during his stage shows, coughs in the audience would have a similar distracting effect. It seemed that all information created an image in Solomon's head regardless of whether or not he wanted it to.

Psychologists have consistently shown that the use of imagery is a particularly effective technique for improving long-term memory. Solomon seemed to have a particular visual ability related to synaesthesia. Synaesthesia comes from the Greek words *syn* meaning 'together' and *aesthesis* meaning 'perception'. Synaesthesia is therefore a form of combined perception where two (or more) senses become intertwined. This means that when one of the senses is stimulated, it automatically triggers another sense that acts involuntarily. For example, days of the week may be associated with particular colours. A student of mine states that 'Tuesday' is definitely a 'blue' day. When asked why, most synaesthetes just say that it just is! There's no explanation for why the senses intertwine. Other synaesthetes might 'taste shapes' or 'see sounds'. These experiences are always the same; the same stimuli consistently evoke the same reactions. This is because they are not learned, they just occur naturally. Synaesthesia tends to be one-directional, meaning one sense may spark off another sense but it doesn't tend to work the other way round. Since synaesthesia is the crossing of two or more senses, there are 31 different possible combinations of sight, smell, touch, taste

and hearing. The most common combination tends to be colour and hearing (chromasthesia). Most synaesthetes experience the fusion of only two senses, but Solomon appeared to have four senses joined! Only his sense of smell did not intertwine with his other senses.

The ability Solomon possessed to form visual images for words was the key to his remarkable memory recall. Whenever he heard a word, whether it made sense or not, an immediate visual image was created. He reported that if he heard the word 'green', he would see a green flowerpot, with the word 'red' he would see a man in a red shirt waving towards him, 'blue' conjured up an image of someone waving a blue flag from a window. Even nonsense words conjured up immediate visual impressions that he could continue to 'see' clearly years later.

When Solomon was asked to listen to tones or voices he saw images. An example of this is the report he gave when asked to listen to a tone of 30 cycles per second at 100 decibels: 'I saw a strip 12–15 cm in width the colour of tarnished silver. Gradually this strip narrowed and seemed to recede: then it was converted into an object that glistened like steel' (p. 22). Such examples clearly show how his synaesthesia worked. Repetition of the tones months later led to exactly the same images being recalled. Every sound he heard summoned up a memorable visual image with its own distinct form, colour and taste.

Solomon's recall of numbers worked in a similar way. He reported the shape of the number 1 as being 'pointed, firm and complete'; the number 2 as being 'flatter, rectangular, whitish in colour, sometimes almost a grey'. Numbers also produced more concrete images: the number 1 was a 'proud, well-built man'; the number 2 was a 'high-spirited woman' and so on. For Solomon, vision, taste, touch and hearing all merged together. Later on in his career, as a professional mnemonist, audiences tested him with nonsense words or foreign languages and even these unfamiliar words produced sensations of taste, touch or vision. These additional bits of extra information helped to cue his recall. Solomon even reported an association with the 'weight' of a word. For Solomon, these sensations were so vivid that he reported, 'I don't have to make an effort to remember it – the word seems to recall itself' (p. 28).

The method of loci

The method of loci is a mnemonic (memory enhancement) technique that Solomon used in order to remember items in a particular sequence. The method of loci refers to 'objects to be remembered that are imagined in known locations' and dates back to Ancient Greece where orators would use it to remember long speeches.

A story that is associated with this technique relates to the orator Simonides of Ceos who was due to give a speech at a banquet in the fifth century BC. In order to receive a message, he left the building whereupon the hall collapsed. All the guests were killed and their bodies were unidentifiable. Using the method of loci, Simonides was able to locate the bodies of the guests based on where he had last seen them in the building. The relatives were thus able to identify their relative's remains. This shows not only how useful the method can be but how important it is to pay attention to messages!

In order to use the method of loci, you need to imagine a familiar route or location. Solomon often used a street or road in his hometown in Latvia or a well-known route in Moscow such as Gorky Street. Once imagined, the images to be remembered need to be placed at points on the walk. Items are thus distributed at various locations such as in houses, by gates, trees or shop windows ('the loci'). In order to recall the list, you need to retrace your steps and 'see' the items placed there.

Solomon's amazing visual memory meant that he had no difficulty retracing these 'walks'. For him, it was as though he was actually walking along the route. On the few occasions when he failed to recall an item, he explained that he had placed the item in a location, which made it difficult to see on retracing the route. Sometimes, he placed the items in a dimly lit spot, say, in the shadow of a tree, and therefore he would not notice the item in question. For Solomon, these mistakes were defects of perception (not seeing them on the route) rather than defects of memory. One example of this involved the word 'egg', which he placed against a white wall and then failed to spot on retracing his steps. When Solomon later became a mnemonist he became more careful at placing objects in appropriate places and mistakes such as these became rarer.

Memory performance

When it became clear to Solomon that people might be interested in his memory ability, he quit his newspaper job and became a professional mnemonist performing his memory feats on stage.

Audiences often tried to catch him out by giving him nonsense or made-up words to recall. Although Solomon found he could do this, all the visualisations that he had to make to recall these 'words' meant that he took quite a long time to process the information. He recalls one of his most difficult performances when he was asked to recall a long series of repetitive syllables (over 50) such as MA VA NA SA NA SA VA MA and so on. Solomon stated:

> No sooner had I heard the first word than I found myself on a road in the forest near the little village of Malta, where my family had a summer cottage when I was a child … The third word. Damn it! The same consonants again … I knew I was in trouble … I was going to have to change paths in the woods for each word … but it would take more time. And when you're on stage, each second counts. I could see someone smiling in the audience, and this, too, immediately was converted into an image of a sharp spire, so that I felt as if I'd been stabbed in the heart.
>
> (pp. 52–3)

Despite these reservations, Solomon still managed to reproduce the sequence correctly. Eight years later and without prior warning, Luria asked Solomon to repeat this monotonous list of syllables and he had no difficulty whatsoever!

As a mnemonist, Solomon tried to simplify his recall techniques in order to speed up his memory performance. As mentioned, he ensured that mental images were clearly 'seen' and he also developed a shorthand system of his images. He tried to create images that were more simple and less detailed. Solomon found that he could still recall the words and that the less-detailed images took less time to encode. With nonsense syllables that audiences gave him to recall, he linked image associations with lots of different syllables. He worked on this for hours each day and became a master at forming images of nonsense syllables. Using such techniques, he could recall words in a foreign language, meaningless mathematical formulae and nonsense syllables.

Luria was adamant that Solomon's memory was an innate characteristic, that he had been born with. The use of mnemonic techniques during his stage performances were simply devices to enhance and speed up his natural ability to satisfy a demanding audience.

Other associated abilities

Solomon's incredible visual memory ensured that he could perform bodily feats due to the power of thought. As he put it: 'If I want something to happen, I simply picture it in my mind' (p. 139). This was no idle boast and he could regulate his heartbeat and even alter his perception of pain through imagery.

To alter his heartbeat, he merely had to imagine that he was running for a train or imagine he was lying perfectly still and relaxing in bed. These images were so real for him that his body altered its physiological responses. In addition, he was able to alter the temperature of his hands by imagining placing one of

them in a hot stove while holding ice in the other hand. Recordings of the temperature of the skin on each hand showed that they had changed by a couple of degrees.

In addition, Solomon could alter his perception of pain. While at the dentist, he would imagine watching someone else having their teeth drilled. This meant that the 'other person' experienced the pain, not Solomon! He could also adapt his eyes to the dark by imagining himself in a darkened room and could produce a cochlear-pupil reflex using his imagination of 'hearing' a piercing sound. Despite being studied at a specialist neurology clinic, few explanations for these abilities were forthcoming.

Memory problems

It is clear by now that Solomon possessed a unique memory. However, there were downsides to his abilities. Due to the abundance of images that were associated with each word he heard he had to have information read to him fairly slowly in order for him to process the word as an image.

Apparently, on meeting Solomon for the first time many people reported him as appearing rather disorganised, dull or slow-witted. This was certainly true if he was read a story at a fast pace. Solomon found that the array of images each word created meant that they collided with the images of the reading voice and those of any extraneous sounds. The result would be a complete chaos of images. A simple passage of writing sometimes became a herculean effort of processing. Skim-reading a passage or taking just the gist of a passage seemed beyond him since each word summoned up such a rich array of images. Solomon found it impossible to single out the most important or key points from a text. Each detail in any text produced further images that often took him further and further away from the central point of any passage.

Solomon was also very poor at processing abstract ideas. To Solomon, everything was processed visually. He said 'other people *think* as they read, but I *see* it all' (p. 112, emphasis in original). He often found that one word in a passage sparked off an image and then from that image he would move to a related one not associated with the original text. His own thinking would guide his linked images rather than the text itself! Abstract words were a real problem as well since they could not easily be visualised. For example, he said that it was impossible to see the word 'infinity'. He saw the word 'something' as a dense cloud of steam and 'nothing' as a thinner, completely transparent cloud. In effect, he could not grasp an idea or word unless he could see it and some

ideas and words cannot be easily visualised! Solomon's torment was to spend many hours of his life trying to grapple with these things that the rest of us cope with quite easily.

Solomon was spectacularly poor at coping with synonyms or metaphors due to the images that crowded in on him. To him, a 'child', 'youngster', 'infant', 'toddler' and so on meant many different things whereas a writer might use them interchangeably without a great deal of thought. To Solomon they were processed in completely different ways. Furthermore, words with many alternative meanings such as 'wear' as in 'to wear away' or 'to wear a coat' would cause serious problems since the image would always be the same despite the different meanings. Often, Solomon would get so bogged down in the detail that he couldn't see the overall picture. Poetry was almost impossible for him to read. Every word would form an image whether or not it was the one that the poet intended, and the image Solomon saw, would, more often than not, disguise the associated meaning.

Another skill that Solomon was also particularly poor at was spotting any form of logical organisation of material. Solomon did not readily spot patterns that might have aided recall, indeed, he never used any logical means of recall at all. Solomon's over-reliance on imagery techniques meant that he often didn't take notice of the meaning of many words. Once he was given a list of bird names to recall – he recalled the list perfectly but failed to note that it was a list of different birds! His imagery technique meant that each word conjured up one or more separate images and these were disconnected from the next word in the list. The same thing happened when he was given numbers that followed a particular sequence. Solomon usually failed to spot any logical sequence. Indeed, he commented: 'If I had been given the letters of the alphabet arranged in a similar order, I wouldn't have noticed their arrangement … I simply would have gone on and memorized them' (p. 60).

Perhaps surprisingly, Solomon had a fairly poor memory for faces, or voices heard on the telephone. He complained that faces and voices were so changeable and depended on the mood or expression they had at the time. Solomon saw faces as constantly changing. The recognition of faces was compared to watching a wave changing its shape. Solomon claimed that a person's voice could change as much as 30 times a day. Each voice change produced a different set of images for Solomon and hence recognition of one voice was difficult. Indeed, he was known to become so preoccupied by the sound of a person's voice that he didn't register what they were actually saying. Of course, this might be seen as an advantage with some people!

Solomon's synaesthesia enabled him to have a phenomenal memory but the lack of a dividing line between his senses did result in rather strange occurrences. For example, he reported that in order to eat in a restaurant there had to be the right kind of background music playing. Otherwise, the sound of the music would interfere with the taste of the food. Solomon stated that: 'If you select the right kind of music, everything tastes good. Surely people who work in restaurants know this' (p. 82). One occasion is reported when he fancied eating an ice cream and went to buy one from a nearby stall. However, when asking what flavours were available the ice cream seller replied 'fruit ice cream' in such a tone of voice that 'a whole pile of coals, of black cinders, came bursting out of her mouth, and I couldn't bring myself to buy any ice cream after she'd answered that way' (p. 82). Another example of this concerns the Russian word *svinia*, which stands for 'pig'. For Solomon, this word evoked fine and delicate images quite at odds with the qualities usually associated with pigs. For Solomon both the sound of a word, the voice of the speaker and the meaning of the word would be encoded together. For Solomon, all of these things had to fit together.

Trying to forget

Unlike most people, who spend time trying to devise strategies for remembering, Solomon spent time trying to devise strategies to forget! It became increasingly clear to him that he needed to forget information. After becoming a professional mnemonist, when he would give several performances a day in the same venue, Solomon found that he was having difficulty organising all the material he had to remember. Solomon developed a number of strategies to try to overcome this.

First, he deliberately tried to restrict the images that he used to aid recall. He tried to focus his attention and limit the images to the essential details that he would need to recall the item to be remembered. In effect, he began to make shorthand versions of his images. He still remembered the material perfectly but did not need to encode all the rich details that each item would normally evoke. Although this helped, he still needed a way to completely forget material rather than just code things in a simpler form.

One way he tried to forget was to mentally rearrange material on paper that he had remembered on previous performances. He then imagined screwing up the paper and throwing it away. However, he still reported difficulties of forgetting. Solomon found interference occurred if material in a subsequent performance was similar to that presented during an earlier performance. This is an example of proactive interference where older memories affect newer

memories. Furthermore, the more similarities between the material, the greater the interference. For once, Solomon's memory seemed to work like everyone else's since interference is one of the suggested explanations for forgetting. Although it must still be recorded that Solomon did not actually forget any of the material, he merely found it more confusing to learn and recall.

So Solomon still needed to develop a technique for forgetting. He realised that many people wrote things down in order to try to aid recall, which, to him, seemed ridiculous. Nevertheless, he wondered if he might write things down in order to forget. He reasoned that if something was written down, there would be no reason to continue to remember it! He tried this technique and then discarded the pieces of paper, even burning them on occasion. Unfortunately, he found he could still see the numbers on the charred embers!

It seemed to Solomon that he would be forever affected by the inability to forget and this became an increasing worry to him. Then, out of the blue, Solomon found a method for forgetting that neither he nor the psychologists studying him fully understood. He explains that after giving three performances in one evening, he was worried about interference effects during his fourth performance. He thought:

> I'll just take a look and see if the first chart of numbers is still there. I was afraid somehow that it wouldn't be. I both did and didn't want it to appear … and then I thought: the chart of numbers isn't turning up now and it's clear why – it's because I don't want it to! Aha! That means if I don't want the chart to show up it won't. And all it took was for me to realise this! … At that moment I felt I was free … I knew that if I didn't want an image to appear, it wouldn't.
>
> (pp. 71–2)

Strangely, this technique of deliberately trying to forget seemed to work although, to this day, no one knows how it worked.

The paradox of Solomon Shereshevsky

So what can we make of Solomon Shereshevsky? Solomon's life was a paradox. His greatest ability was also his greatest handicap. His amazing memory meant that he found it difficult to forget, but despite this he did appear slow and forgetful to others. It is reported that his uncle said that Solomon only had a good memory if he consciously committed the information to memory and

that he trained hard for hours each day for his stage performances and was frequently frustrated by the many memory experimenters who tested him and seemed to think he was some showman or charlatan. His memory created practical difficulties for him on a day-to-day basis and he continued to have difficulty distinguishing reality from the images created in his head. He spent hours each day daydreaming on a journey through his remarkable memory. Although successful as a stage mnemonist for a time, he had many other jobs and never really found a satisfying career that exploited his astounding abilities. It is particularly difficult to draw parallels from his memory to 'everyday' memory ability since his capacity and processing techniques differed so markedly from the norm. Solomon ended up working as a taxi driver in Moscow and never had any excuse for going the wrong way! There are mixed reports about what happened to Solomon, and to some extent he disappeared off the radar. The *New York Times* reported that he married and had one child and that he died in 1967 aged 72. Other reports claim he ended his days in a mental asylum, although Solomon claims he merely attended Moscow's Hospital for Diseases of the Nervous System for testing in the hope they would find nothing wrong with him. An article in the *New Yorker* magazine (Johnson, 2017) found strong evidence that he died in 1958 from complications arising from alcoholism. Solomon was always striving to do something great in his life but probably felt he didn't succeed. However, his legacy to psychology may mean that in the end he actually achieved his goal. Professor Luria continued with his successful academic career until his death in 1977, and in 1972 he wrote about another famous case of a man called Zasetsky who had suffered a major brain injury.

Notes

1 Solomon Shereshevsky is his actual name, although his surname is sometimes spelt slightly differently. Often, participants' real names are kept confidential and individuals are referred to by their initials only. In many articles and books, Solomon Shereshevsky is referred to simply as 'S'. However, since his name is now well known, it seems reasonable to refer to him by his actual name. Material in this chapter has been drawn from Luria (1968).
2 Page numbers for subsequent citations to this work are given within parentheses in the text.

References

Johnson, R. (2017). 'The mystery of S., the man with an impossible memory'. *New Yorker*, 12 August. Available at www.newyorker.com/books/page-turner/the-mystery-of-s-the-man-with-an-impossible-memory (accessed 28 September 2019).

Luria, A.R. (1968). *The Mind of a Mnemonist*. Cambridge, MA: Harvard University Press.

Chapter 2

The man who lived for the present

The story of H.M. (Henry Gustav Molaison)

One summer day in 1953, brain surgeon Bill Scoville tried an experimental technique to cure one of his patient's debilitating epilepsy. With his patient still awake, he cut a hole in his head and sucked up a part of his brain through a silver straw. As he later joked, instead of removing his epilepsy, he removed his memory. H.M., as the patient was referred to, was destined to become one of the most famous neurological cases in the world.

H.M.'s past

Henry Molaison (H.M.) had a fairly uneventful childhood. He was born on 26 February 1926 in a working-class area of Hartford, Connecticut, the product of small town America. He was a quiet, reserved and shy boy who did the typical things of his age. He'd spend time with his friends at the local soda shop and swim in the local reservoir. He had a particular interest in shooting and would spend many happy hours exploring the woods near his home hunting for birds and pheasants for the pot. One incident that was later seized upon by doctors occurred when he was knocked unconscious by a boy on a speeding bike. Seventeen stitches were needed to mend the wounds to his face and head. It has been suggested that some of his subsequent neurological problems may have had their origins in this incident.

On his sixteenth birthday he was driving with his parents to town in order to celebrate his birthday. Suddenly, his body stiffened and he had the first of many full-blown 'grand mal' epileptic seizures. H.M. lost consciousness, his body stiffened and yet he also began jerking uncontrollably. He bit his tongue so severely that it bled and he lost bladder control. His breathing became shallow until the jerking stopped after a minute or so. These are the classic symptoms of

a 'grand mal' seizure. These seizures are the symptoms of epilepsy. Prior to this, H.M. had noticed moments when his mind went blank but these effects were only temporary. H.M.'s three first cousins on his father's side also had epilepsy, suggesting a family trait.

Epilepsy is a neurological condition that makes people susceptible to seizures (the old name for a 'seizure' was a 'fit'). A seizure is caused by a temporary change in the way the brain cells work. In the enormous network of neurons that make up the brain, billions of electrical messages are fired to and fro. These determine virtually all our thoughts, feelings and behaviours. Occasionally, without warning an upset in brain chemistry causes these messages to become scrambled. The neurons 'fire' faster than normal and in bursts. It is this disturbance that causes a seizure. A seizure usually only lasts a few seconds or minutes and then the brain cells return to normal functioning. Epilepsy can be inherited but often no cause is readily found.

Unfortunately, H.M. was not treated very sympathetically by either his family or peers. He was teased at school and ended up leaving and having to graduate at a different school. On graduation day, his teachers refused to let

Figure 2.1 Photo of Henry Molaison by Suzanne Corkin