

Talk given by Popplewell LJ to COMBAR 7 November 2023:

JUDGING TRUTH FROM MEMORY

1. I am very grateful to Professors Ray Dolan and Christopher Brewin for reviewing an earlier draft of this talk with a view to ensuring that the science is accurately described. All errors are my own.
2. There was a Greek interpreter who used to appear in many of the shipping cases, some of you may recall him, a Mr Pavlides. His translations of the witnesses' evidence were regularly peppered with "if I remember well", rendering the Greek "αν θυμάμαι καλά". That's the title of a Greek song by Peggy Zena, no doubt familiar to Lord Legatt's Greek wife and perhaps the inspiration for his well-known judicial observations on memory in *Gestmin SGPS SA v Credit Suisse UK* [2013] EWHC 3560 (Comm) of which more later. I prefer "If your memory serves you well" from Bob Dylan's This Wheel's on Fire.
3. I want to focus in this lecture on what the current state of scientific research tells us about when and why our memories don't serve us well, and to consider what lessons we can learn when it comes to the exercise of fact finding in commercial dispute resolution. Not just lessons for judges and arbitrators, but, I hope, tools for advocates in seeking to persuade fact-finders how to choose between conflicting oral evidence.
4. How often do witnesses lie in commercial litigation? From my own experience I would suggest that it is a small number. The overwhelming majority are giving honest evidence, which if unsound is nevertheless a genuine recollection of something which did not occur, rather than deception. That was the view of Lord Bingham in the well-known essay "The Judge as Juror" reproduced in his 2000 book *The Business of Judging*.
5. Factual disputes are the core aspect of most commercial dispute resolution. Once the facts are found, it is often, although not always, straightforward to

apply the law. It is common to hear judges echo what Lord Bingham also said in that essay, that the thing they find most difficult about the job is resolving issues of fact, and for my part I would agree. So if the conflicting evidence is mostly being given honestly, how is a judge or arbitrator to choose between different accounts? How can advocates convincingly persuade the tribunal to accept one version over another?

6. The theme of this talk is that the answer lies in the science of memory, and the different reasons and mechanisms by which witnesses come to give honest but mistaken evidence.
7. Along the way I will be suggesting, paradoxically, that recollection has perhaps become undervalued in contrast to the increasing primacy attached to contemporaneous documents and inherent probabilities. Human memory is very remarkable for the accuracy of much which is recalled. For every honest but mistaken recollection which is rejected by the court, there will be one or more accurate recollection(s) which the court accepts.

What is the fact-finding exercise in commercial trials?

8. I want to say something first about the nature of the fact-finding exercise in commercial litigation. In this context we need not get distracted by the metaphysics of what is meant by truth; nor the concept of my truth and your truth.
9. However, despite the ubiquity of emails and other forms of electronic communication, there are many cases which turn upon disputed recollections which written records cannot resolve. The Court's task is often to decide what happened in circumstances where the documentary record is silent or inconclusive on the critical points. Where the contemporaneous record of the facts is clear and unambiguous, cases which turn on those facts will often settle. As advocates and fact-finders we are interested in the other cases, which are what fill the commercial list.
10. And determining *what* happened is not the only task. Commercial litigation often involves an inquiry into a witness' state of mind. That state of mind

may be an essential ingredient of the cause of action, as for example where claims are framed in constructive trust. But more generally, it matters what the witness knew, or believed, or was thinking or intended at a particular point in the narrative of events because that casts light on the events themselves. Fact-finding is concerned not only with what happened, but just as much with why it happened. For reasons I will explain, the fallibility of memory poses particularly acute problems when seeking to determine what was in a witness' mind by way of knowledge intention or belief.

Inherent probabilities and contemporaneous documentation

11. Before I come to the science of memory, which I promise you I will shortly, I would like to say something about the twin pillars, inherent probabilities and contemporaneous documentation, in whose shadow recollection stands as the poor relation. Both, of course, provide very valuable tools for getting at the truth, and I should not be thought to be suggesting otherwise. But they too suffer from fallibilities.

Inherent probabilities

12. Recourse to “inherent probabilities” does so in at least two ways.
13. First it involves a subjective value judgement about how people usually behave applied to a specific factual setting. This is problematic because human behaviour is diverse, and the individual experience of any single judge, arbitrator or advocate is rarely full enough to be well informed about typical behaviour of the individual in the particular factual context.
14. Lord Bingham said: “An English Judge may have a shrewd idea of how a Lloyd's broker, or a Bristol wholesaler or a Norfolk farmer might react in some situation, but he...should feel very much more uncertain about the reaction of a Nigerian merchant or an Indian ship's engineer or a Yugoslav banker.” Speaking for myself I'm not sure I would be confident even about the Lloyds broker let alone the Bristol Merchant or Norfolk farmer.

15. In criminal cases, one of the reasons we have juries as fact-finders, or at least one of the perceived advantages, is that the 12 jurors have a diverse range of life experiences being brought to bear on interpreting and judging human behaviour.
16. As commercial judges arbitrators and advocates, I wonder if there is an element of overreach in our asserting what would be expected in given circumstances. In doing so, we have recourse to a much broader range of what we assume to be our knowledge of human behaviour than would meet the test for the doctrine of judicial notice. Do we really have a sound basis for expressing a view on the inherent probabilities of the behaviour of a Kazakhstan plutocrat or Japanese businesswoman or Taiwanese crew member?
17. The second problem with recourse to inherent probabilities is that probabilities are no more than that, and I'm sure we have all had experiences in life and litigation in which the apparently improbable turns out to be what happened.
18. Shortly after I started at the Bar, I was on a train back from Stafford Magistrates Court with an articled clerk, as they were then called, from Clyde & Co. When I asked conversationally what he was doing next, he told me he was acting for the insurers of a vessel which had been scuttled. It had, he said, been gently run aground on a spit of sand on a calm clear night, right in front of a lighthouse, by an unqualified chief officer who had just been flown out to the vessel by her owners, and when the German salvors came on board, they found the seacocks open. It sounded a pretty clear case.
19. When I returned to chambers I found I was to be instructed as second junior for the owners. The case was *The Zinovia* [1984] Lloyd's Rep 264. All that the articled clerk had said was true. But after a 44 day trial Bingham J held that the vessel had not been scuttled. It turned out that the three people on the bridge had no common language between them and that the Algerian lookout's warnings about the lighthouse were not understood and ignored until too late. Running the vessel aground at that particular spot involved a

highly skilled piece of navigation which would have been quite beyond the skills of the chief officer, who did indeed lack any officer's ticket. The dispute about the seacocks was explained by the enmity between the German salvors and the Greek crew who were refighting the hostilities of the second world war.

20. All of you who have been involved in litigating about maritime casualties will know that there is a sound basis for the expression "stranger things happen at sea".

Contemporaneous documentation

21. As for the weight to be attached to contemporaneous documents, what I hope to illustrate this evening is that there are many reasons why memory may be unreliable even when retrieved and recorded in a document at a very early stage, so that "contemporaneity" does not necessarily confer primacy or accuracy. I will return to this.

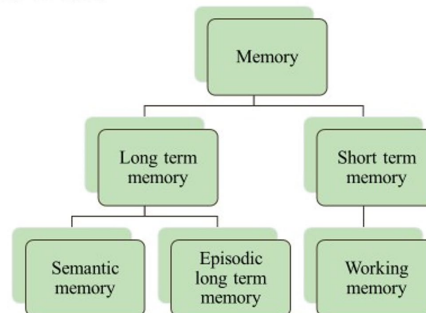
The science

22. So to the Science. In the 10 years since *Gestmin*, there has been a surge in the scientific research into what is commonly labelled false memory. The theories and observations of experimental psychologists have been adapted and enriched as a result of data from neuroscientists about the biological functioning of the brain. Modern imaging and other techniques can now reveal a great deal of what is happening with the connectivities within the brain, non-invasively.

The architecture of memory

23. Human memory is not a unitary faculty but rather comprises an alliance of several systems, each of which performs a different function, although they inter react with each other.

THE ARCHITECTURE OF MEMORY



24. Memory is divided into short term memory and long term memory: There are three systems of central importance for our purposes:

- (1) working memory, which is short term and provides the temporary capacity to hold information in mind and manipulate it for everyday tasks.
- (2) semantic memory, which is the aspect of long term memory which holds our knowledge of the world; and
- (3) episodic long term memory, which enables us to remember specific episodes and events, and distinguish them from other earlier or later events of a similar kind.

25. There are other systems but they are of less significance to the theme of this talk.

26. As well as the three main memory systems, there are also three stages to each system. They apply just as much to artificial systems as to our biological ones, and will perhaps seem obvious to you. They are:

- (1) encoding: feeding the information into the memory system;
- (2) storage: the preservation of information in the system (in fact there is a consolidation stage, which is a stabilisation stage, as well as storage, but we can use storage as a shorthand); and

(3) retrieval.

27. Let me say a little more about each of the three memory systems.

Working memory

28. This can both hold and manipulate information, capable for example of remembering a telephone number while keying in the digits, or the content of a document when putting it to a witness in cross-examination. You can think of it as our mental workspace.

29. Working memory is a temporary memory system, not designed for long term retention. It involves continuous neural firing of a network of brain cells. It has great fidelity, but if something interrupts it, you lose it. When scientists talk of short term memory, this is what they mean: essentially processing capacity, not retention of memories for a shorter rather than longer period of time. Being able to remember something the next day is for psychologists the domain of long term memory not working memory.

30. Let's do a test of your working memory. If we put on the screen the letters "t c a J n u a s d F t g e i", and leave them there for 8 seconds, see if you can recall them.

31. Now look at them reordered on the screen as FantasticJudge. They are the same letters, but you'd all be able to repeat those if you'd only seen them for a second or two. Why so? That's to do with semantic memory, which is the next topic. The difference explains the way passwords for wi-fi routers, or autosuggested on websites, are constructed so as to make them infuriatingly difficult to remember.

Semantic memory

32. This term refers to the immense amount of knowledge of the world that we accumulate as we grow up and go through life. It's one aspect of our long term memory, which involves changes in the connectivity of brain cells in various ways. It's sometimes described as memory for concepts facts and ideas. We acquire it from education, formal and informal, from social

interaction, and from directly experiencing the world around us. It gradually accumulates throughout life, and is less vulnerable to the effects of age or trauma than episodic memory. Hence, the number of words we know, for example, tends gradually to increase as we get older. It is constantly changing and reshaped by our continuing experiences.

33. Its importance for present purposes is twofold. First our semantic memory affects what is encoded in our memory in the first place. In the example I gave you of trying to encode a series of letters, we are using semantic memory to read FantasticJudge, as two words with which we are familiar, even if you don't often hear them used together, so as to be able to encode long term memory of the letters.
34. That's a simple example, but it works on a more sophisticated level which is more relevant to my theme. This was first well illustrated in an influential book published in 1932 by a psychologist called Frederick Bartlett, based on studies arising out of an experiment using a native American folk tale called "War of the Ghosts". Bartlett asked those in the study to read the folktale, and then retell the story. The key thing about it was that it contained supernatural and local ethnic themes which were not familiar to the readers.
35. What Bartlett found was that elements which did not fit in with the readers' own previous experience and expectations were omitted or transformed into something more familiar. The details which were outside the readers' common experience were less reliably recalled. A central insight from the research was that the retelling displayed **a search for meaning**. In other words a tendency to interpret what is seen and heard by reference to our own experience and world view, what the psychologists call "schema".
36. Later research, both psychological and neurological, has provided major support for that insight. When we encode our memories we don't photograph what is happening; we interpret what is happening, and that interpretation uses our schema.
37. One study, for example, had observers looking at a chess board for 5 seconds and then being asked to identify the position of the pieces. Chess masters

could identify the position, on average, of 16 pieces whereas novice chess players identified only 4. But when the pieces were put in positions which made no sense for a game of chess, the chess masters were reduced to the same level as everyone else. Another study showed that lists of medical test results were much more fully and reliably recalled by experienced diagnosticians than medical students.

38. So experience and expertise can make a big difference to what goes into our memory. This effect of semantic memory on encoding is why a seagoer witnessing a maritime incident may encode much fuller and more accurate details than an observer with no nautical experience. Or an experienced business person or diplomat may encode the nuances of what was said at a meeting more reliably than an inexperienced observer. It provides one reason why one witness's honest recollection may be preferable to that of another.
39. This was, perhaps, what Proust was referring to when he said "Remembrance of things past is not necessarily remembrance of things as they were". Or Shakespeare in Sonnet 113 "My most true mind thus makes mine eye untrue." Or for the less highbrow of you a quote from Anais Nin, the 20th Century American writer, of, amongst other things, erotic literature: "We don't see things as they are, but as we are"
40. The semantic memory can also corrupt a recollection by affecting it at the retrieval stage. Our beliefs, attitudes and approach, our worldview, our schema, changes over time. The recollection is affected by the schema at the time of retrieval, which may be different from that which applied at the time of the events in question. That applies to some extent to recall of events, where, as we shall see, semantic memory can do some filling in of the gaps where details are forgotten. It is especially important to keep in mind when witnesses are giving evidence of what they thought or believed at the time of the events under scrutiny. As Leggatt J said in *Gestmin* "Memory is especially unreliable when it comes to recalling past beliefs. Our memories of past beliefs are revised to make them more consistent with our present beliefs."

Episodic long-term memory

41. This allows us to recall individual episodes or events. The Canadian psychologist Endel Tulving coined the label episodic long term memory, and he referred to it as what enables us to engage “in mental time travel.” It is the system which is most obviously central to the reliability of oral evidence given at trial. It is, however, the most fallible of the memory systems for reasons which apply at each of the three stages, encoding, storage and retrieval.

42. Let’s take each of those stages in turn.

Encoding episodic long term memory

43. We encode automatically whatever is in the focus of our attention. It is our common experience that longer and more focused attention leads to more accurate recollection than a brief glance; and central features are more likely to be encoded than peripheral detail.

44. I have already referred to the influence of semantic memory which may make the encoding of what we are focussing on more or less reliable because we bring our schema to the interpretation of it. We encode our attempt to try to make sense of it, and witnesses will not all have the same interpretation.

45. There are a number of other factors which affect the reliability of memory at the encoding stage.

46. In 1999 Simons and Chabris did a famous test which involved 6 students, passing baseballs between them, three in white shirts and three in dark shirts. They were asked to count the number of passes made by those in white shirts. The answer was 15. The point of the experiment was that a man in a gorilla suit wandered between the students in plain view. 50% of the viewers were so focussed on the counting of passes that they did not see the gorilla, and I confess I didn’t when I first saw it years ago. Yet if you watch the footage (it is on YouTube if you search for “invisible gorilla”) the presence of the gorilla

is plain and obvious. He is there walking slowly across the scene, pausing to beat his chest, and then ambling off.

47. There are many studies demonstrating that not everything that meets the eye or ear is noticed when we are focussing on something else, which is known as attentional blindness or inattention blindness. Another study involved an interviewer asking students a series of questions on campus, in the middle of which two people carrying a door would walk between them and the questioner would be replaced whilst the door obscured the view. Only 50% of the interviewees noticed the change of interviewer.
48. I find these results striking and significant for our commercial litigation environment. When a witness in a motor accident says that they just didn't see the motorcyclist, the chances are that they are not lying, but merely mistaken about the motorcyclist's presence: attentional blindness. The same is true if in our commercial world, a witness says that they did not see or hear something which the other evidence at trial irrefutably establishes occurred. We may be too ready to treat them as lying. Our instincts might be: "they can't have failed to register the plain and obvious which was staring them in the face." But that would be our instinct about the 50% who did not see the gorilla, and we'd be wrong.
49. So the underwriter who confidently testifies that a matter was not disclosed to them may be mistaken simply because it was not a matter which they regarded as a significant detail at the time, or it may be because they were distracted. There was a story of a broker at Lloyds in the 1970s, who used to take a parrot with him whenever he went to the underwriter's box with what he regarded as a particularly difficult risk to place. Perhaps apocryphal, although I see there is now a licensed firm of insurance brokers called Policy Parrot.
50. Another reason for encoding error is confirmation bias. The studies illustrate that we tend to see or hear what we want, or expect, to see or hear. People

going into a meeting expecting and wanting agreement on a point are more likely to interpret what is said as agreement, when in fact what was said was more ambivalent.

51. Another reason for encoding error is that social conformity can play a part. One study illustrates that where we know what our social peers are thinking or describing, that can affect what we think happened, and especially so if the peer is a superior or someone we respect. So an account of what happened at a meeting may be encoded in a way which is heavily influenced by what a colleague or boss has said at the meeting, or in a note or email which follows it.

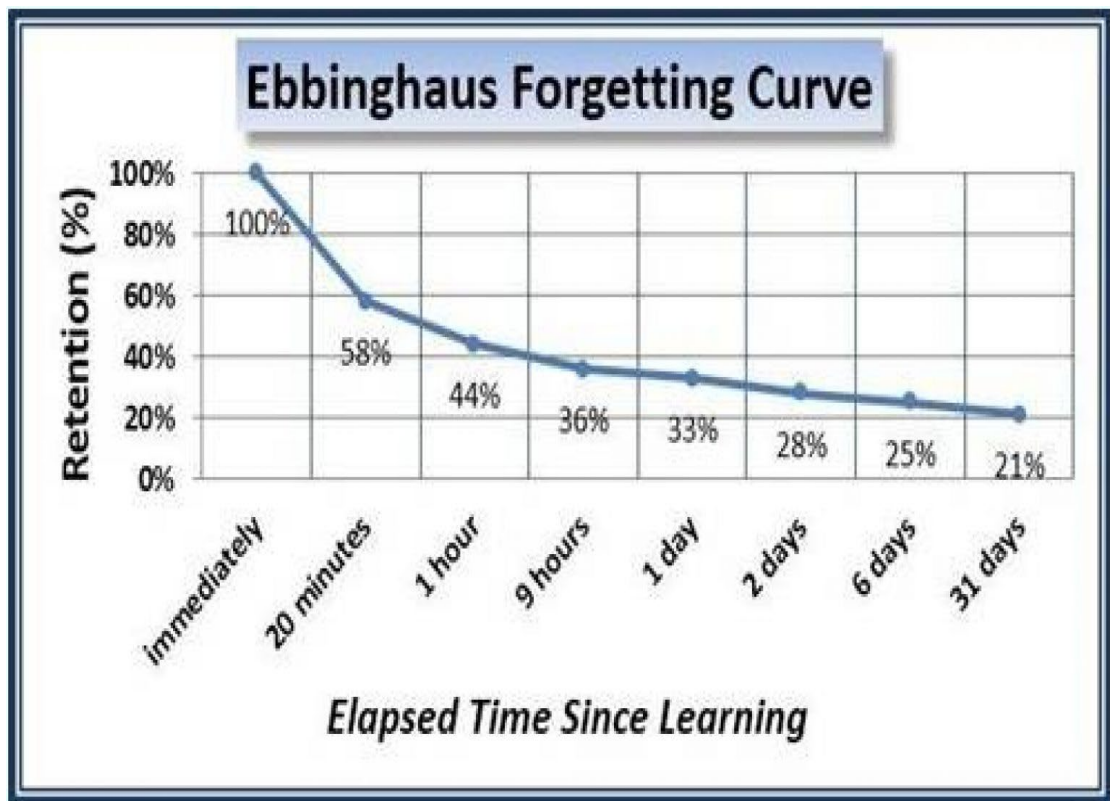
52. Further, encoding is often influenced by pride or wishful thinking. It is a common, although not universal, human tendency to want to portray our participation in events in a way which paints us in the best light. This happens in the public forum of giving evidence at trial. But it can also infect how witnesses picture events to themselves when first encoding the memory. The motorist will often underplay their own speed when encoding the memory of an accident. The business person will overplay the clarity with which they think they expressed themselves when ambiguity would reflect badly on them or their business reputation. They embed in their memory from the start a recollection of saying doing what they think they ought to have said or done.

53. Moreover encoding may be influenced by other forms of subconscious bias. Supporters of rival football teams have been shown to observe, report and remember more fouls by the opposing team than in fact occurred, and fewer by their own. Perhaps more relevantly for commercial litigation, the bias may often be the result of loyalties and personal ambition, so that the evidence is skewed because the witness feels a desire to assist the organisation for which they work, or the party who has called them as a witness, or a friend. It arises not only at the stage of giving a witness statement or oral evidence at trial, but also at the encoding stage. It can be baked into the memory from the start.

54. Finally on this aspect of long term memory, the encoding stage, encoding for long term episodic memory is affected by working memory. The working memory system depends on an attentional control system capable of selecting and manipulating information, which is closely related to general intelligence. Put simplistically, the encoding of episodic long term memory is more efficient if the working memory has greater processing capacity. Most of us are not blessed with the processing capacity of a Lord Sumption, one of whose advantages was that he remembered almost every case he had read.
55. Pausing there, having dealt with the encoding stage and before I move to the storage stage, you will perhaps begin to understand why I expressed a little pushback on the court giving such primacy to contemporaneous documents. They may be produced near the time, but they are produced after the memory has been encoded, and if there is an encoding fallibility, which there may be for all these different reasons, it infects the so called contemporaneous record every bit as much as other reasons for the fallibility of recollection which affect it at the storage and retrieval stage.

Storage of long term memory

56. Here the problem stems from forgetting, and from what our brains do when we forget.
57. If our memory systems stored every detail we experience, they would require massive capacity and it would result in a major retrieval problem. Selective forgetting is a way of coping with this, which involves the episodic long term memory automatically and subconsciously selecting those features which are most likely to be of future importance, and discarding the remainder. Such selective forgetting typically discards detail.
58. We know that forgetting does not happen at a constant rate: it occurs rapidly at first and then more gradually: the curve follows a logarithmic function. In 19th Century, Ebbinghaus did a number of studies. Here's the graph from one of them:

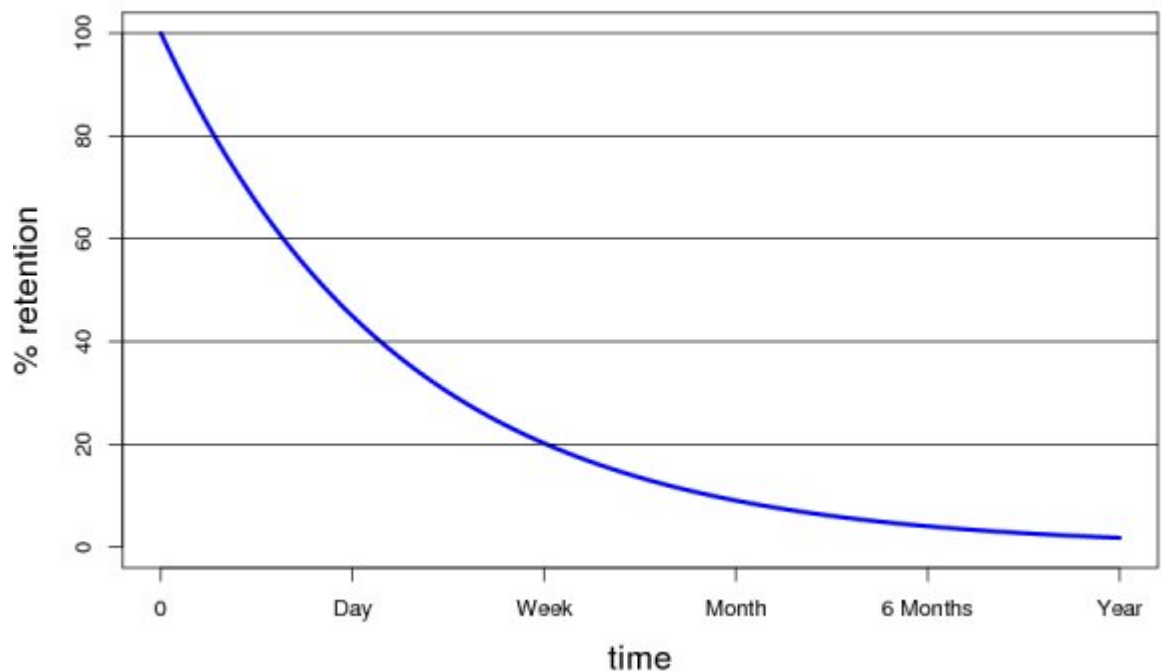


59. You see it observed 44% retention after an hour, and 33% retention after 24 hours, 21% after a month. One can't simply apply those figures to the memories we are concerned with in litigation, because that was test remembering nonsense syllables. But the shape of the curve holds good for almost all studies with different memory tasks.

60. Lord Pearce said in *Onassis v Vergottis* [1968] 2 Lloyd's Rep 403, 431 that it is "a truism that with every day that passes the memory becomes fainter". The science suggests not. At some point the curve flattens and the forgetting stops. When is this for the sort of memories we are dealing with in commercial litigation? The most helpful study of which I am aware as to how long makes a difference, and how much difference, is by Hirst and others who asked people about the events of the 9/11 attack, such as how many planes were involved, names of the carriers, location of the buildings etc. The survey was conducted shortly after the attack and repeated with different interviewees at intervals, eventually over a 10 ten year period. The results

looked like this.

61. The results showed that there was rapid forgetting of both flashbulb and event memories within the first year, but the forgetting curves levelled off after that, not significantly changing even after a 10-year delay. It was different for different aspects of the questioning, but the curve might look something like this in shape.



62. This isn't from their study, and the curve did not bottom out at zero retention, but it may be a valid approximation of the shape of the curve from the study for our present purposes. If so, it suggests that an account given more than 6 months after events is unlikely thereafter to become significantly less accurate with the passage of time, and after a year it makes no difference.

63. This has relevance for those arguments about the prejudicial effect of delay which arise, for example, in adjournment or case management applications. By the time such applications arise the prejudicial effect of further delay on recollection will usually be insignificant.

64. Other factors affect the storage stage of episodic long term memory. Just as

at the encoding stage we focus on what is important to us, so too at the storage stage we remember better what we are interested in. That's not a conscious decision to do so: it's what our brains do. My wife will remember what people were wearing at a dinner party. I will remember what we had to eat.

65. The forgetting would pose no problem if witnesses simply said that they did not remember. There are litigation reasons why they are not inclined to say they can't remember: for example, the desire to assist their organisation, a fear of seeming inadequate and so on; but there are scientific reasons why the gap is often filled by what is asserted to be a memory but is not.

66. One is reconstruction from semantic memory. We assume that something happened because that is what we would expect to have happened. Just as judges like to invoke inherent probabilities when deciding disputes, so our memories fill in gaps by reference to what we assume we would have done or would not have done. The witness will respond in cross-examination that they are sure that something did not occur because "I would never have done that", or vice versa. The memory sometimes follows that process automatically: we remember that we did something, although there is in fact a gap in our memory, because the semantic memory fills in the gap with what we would have done.

67. The dangers here are several: things do not always happen as we expect them to, and may not have done so on this occasion. We are also applying our present semantic memory schema to our attitudes at a different time. A third is another common source of erroneous recollection, in my experience, which is, again, pride or wishful thinking. We like to suppose that we did or thought that which we now consider we ought to have done or thought. Nietzsche put it this way: " 'I did this', says my memory, 'I cannot have done this' says my pride and remains inexorable. In the end, memory yields".

68. It does so by filling in the gap left by the storage system of memory being selective.

69. Most of the problems with false gap filling, however, occur at the stage of retrieval at least so far as relevant to our topic today.

Retrieval

70. Even if a memory is reliably encoded and reliably stored, it cannot always be retrieved reliably when we need it. Sometimes we can't retrieve it at all although it is there. Think of the occasions on which you are looking for your lost keys, and you think to yourself when did I last have them and what was I doing. But you just can't remember. And then, when you later come across them by chance, it comes back to you what you were doing and why you put them there. Or when something is on the tip of your tongue but you can't quite access it until someone else does.

71. I don't want to be diverted here into discussion of the controversies surrounding recovered memories of child sex abuse. The science today accepts that forgotten memories may be recovered by appropriate retrieval cues.

72. However it is also very well established that errors in recollection can be introduced at the retrieval stage by misinformation and suggestibility.

73. So for example one study found that presenting participants with misleading information that suggested they had seen a Stop sign in a picture rather than a Give Way sign, or vice versa, resulted in correct recall of this detail falling by approximately half.

74. We are probably familiar with this idea in general terms but perhaps we underestimate how substantial a degree of corruption can be caused by subtle differences in the way questions are asked. For example in a well-known study in 1974 by Loftus and Palmer participants were asked to watch a film of a car accident and answer specific questions afterwards. Some participants were asked to estimate how fast the cars were going when they hit each other. Others were asked how fast the cars were going when they smashed into each

other. Speed estimates were very significantly higher by those asked the question in the “smashed into” formulation than those asked in the “hit” formulation.

75. And 32% of those who had been asked the “smashed into” version of the question said they had seen broken glass when there wasn’t any. So the memory for events can be fragile enough to be distorted by changing one word in one question at the retrieval stage, even when the retrieval is what would be characterised as contemporaneous.

76. You will observe that this is another potential reason for fallibility in a contemporaneous record if it has been elicited by any form of questioning: for example if an employee is asked “Can you write a note of the meeting this morning in which the other side gave their agreement.”

77. The significant risk of misinformation or suggestion creating false memories is well recognised in our criminal law system, and it dictates how the police conduct interviews with both suspects and witnesses. The required interview technique is influenced by the studies which support the form of questioning least likely to corrupt recollection. Typically it invites the witness’ own narrative first, unaided, and then goes back to ask questions about details. This is because it is established that the narrative technique is best for accuracy, whilst the interrogative technique is best for completeness in recalling further details. The same will apply to taking statements from witnesses in civil cases.

Witness statements as evidence in chief

78. This leads me to identify a number of related problems arising from our system of taking witness statements and having them serve as evidence in chief. The first is the suggestibility effect of the terms in which questions are asked, coupled with the very process by which statements are produced, which often involves the polishing of numerous drafts and iterations. This is bound to result in the final version being different from the witness’ uncued

recollection before the process started. In the survey of those practising in the Business and Property Courts conducted by the Witness Statement Working Party a few years ago, a majority of practitioners considered that witness statements failed to reflect the witness' own evidence. A majority.

79. The second and related problem, or perhaps just another aspect of the same problem, arises from "refreshing" the witness' memory from something in a document made nearer the time, often written by someone else. We are very familiar with this and it is a staple of witness statement production and therefore oral evidence in commercial dispute resolution. But we must ask: Is it restoring a memory which has been retained but needs the right retrieval cues to enable it to come back to mind? In other words retrieving a genuine but hitherto unrecalled memory? Or is it just another example of filling a gap in memory by suggestion, in which case it is the *creation* of a memory which is only as valid as the reliability of the information from someone else on which it is based?

80. The answer is that it may be either. My point is not only that practitioners and fact-finders should keep in mind that the witness statement process may be creating memory, not restoring it; and if so, the creation is only as sound as the material upon which it is based. It is also that the witness will honestly believe in the corrupted recollection. It will become their memory.

81. And one source can corrupt a number of memories, especially if it is a contemporaneous document which is afforded primacy but suffers from the encoding fallibilities we have been considering. So the fact that 5 witnesses on one side have a recollection which differs from one witness on the other side is not necessarily a guide to who is right. Fact-finders should be wary of succumbing to a numbers game.

82. The third potential problem arises from repeated rehearsal of the witness' account both during the statement taking process and thereafter. Witnesses are encouraged to re-read and be familiar with their statements in preparation

for cross-examination.

83. Now there is research that suggests that retrieval of memory boosts future retention: what is called the testing effect. Repeated rehearsal after retrieval does not necessarily corrupt, and if it is accurate, the repeated retrieval and rehearsal tends to embed the encoding more deeply so that there is better later recall. But obviously if the retrieval is of a corrupted memory, for any of the reasons we have been looking at, whether at the encoding storage or retrieval stage, the effect is exacerbated by repeated recall, because errors made initially will become more strongly established and held with increasing certainty. Rehearsal may give the witness greater confidence in an account which has been corrupted earlier.

84. Moreover, rehearsal can itself be a corrupting mechanism. Once retrieved and retold a number of times, the rehearsed account can change the memory by replacing it. We are remembering the previously retrieved memory, not the events themselves. This has been observed in the studies, for example by Whipple, and accords with my own experience, both personal and professional. I don't know how many of you have experienced an occasion where you are telling a favourite anecdote about a past event which you have often retold over many years, and someone who was actually there at the time objects that it contains an inaccuracy, which when it is mentioned you have to concede. We may adjust the story a little each time we tell it so the story becomes the memory. Whipple concluded that repeated rehearsal tends to lead to a departure from the original memory because we are remembering the account, not the original experience. And we change the story as we retell it. A form of single handed Chinese Whispers if you like.

85. Indeed that is what I found had happened to my account of the scuttling case, *The Zinovia*. I have often told it over the last 40 years as an illustration that things are not always what they seem. When I went back to read the law report for the purposes of preparing this lecture, I found that some of the detail I've given you is not quite accurate. But as my wife would say, never let the truth get in the way of a good story.

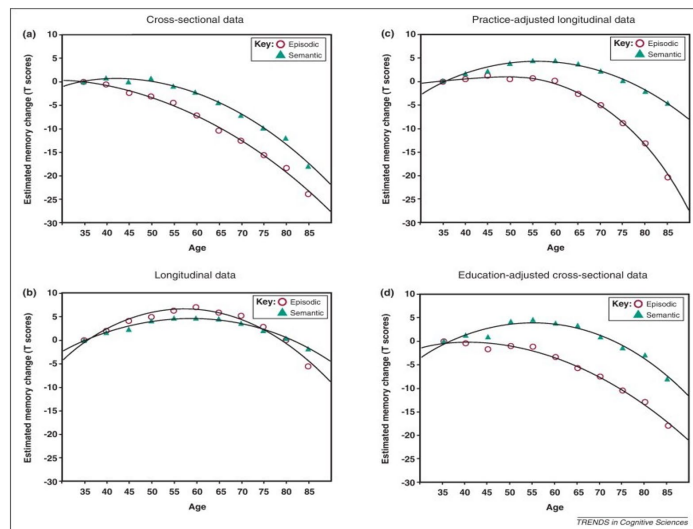
86. A fourth problem which can arise at the retrieval stage is that sometimes, the science shows, the gaps are filled in with information from our semantic memory, that is our general knowledge, just as it can be at the storage stage. There have been hundreds of studies demonstrating the Deese-Roediger-McDermott (DRM) paradigm, which I'm sure you all know involves people falsely remembering what is termed a "critical lure" when presented with associated material. So for example if asked to remember a list of items including the words pillow sheets and sleep, people falsely remember bed as on the list, bed in this example being the critical lure. Similar results are found with critical lures using prose, pictures or scenes. The rates of false recall of critical lures are typically high in the studies. This is our semantic memory interfering with our episodic long term memory at the retrieval stage.
87. We are all, I think, aware of the danger of the witness statement process producing unreliable evidence. But I wonder whether we underestimate the way it influences the creation of false memories which will be genuinely recalled.
88. In our criminal justice system we still insist on evidence being led orally from the witness in evidence in chief with non-leading questions. This is a way in which we seek to minimise the danger of retrieval cues affecting memory by suggestibility or misinformation. We used to do that in commercial cases, as in civil litigation generally, long enough ago for it to be beyond the experience of many of you. Before witness statements were introduced, there might be a proof taken for the purposes of oral examination in chief but it was often confined to the essentials. Examination in chief contained evidence which was to a significant extent spontaneous recollection, as indeed was evidence given in cross examination. And the former was elicited by questioning which was designed to avoid suggestibility and was patent to the court. It is worth remembering that our criminal justice system still regards that as necessary to avoid an unacceptable risk of injustice.
89. Now I do not want to be misunderstood. I am not suggesting an abolition of

witness statements and reversion to the old ways. Witness statements perform a number of very useful functions. Moreover I recognise that in commercial cases, witness statements are often not the first vehicle for the witness' recollection. It may first appear in a communication with colleagues or an internal report; or in an account for legal advisers at the stage of giving advice prior to proceedings or for the purposes of pleadings. All I am concerned to emphasise is that by the time something gets into a final witness statement and is then automatically treated as the witness' evidence at trial, there are a great many reasons why the recollection may have become corrupted without the witness knowing that that is what has happened. The witness will believe it is a sound recollection.

Age

90. Let me touch briefly on the effect of age on memory. In healthy people the storage and retrieval functions are impaired by age, although not perhaps as you would expect.

Effect of age on memory



91. It's the top right graph you want to look at. Our semantic memory (green symbols) typically continues to improve until our sixties, and then drops off gradually: at 80 it is generally no less than at 30. If the changes in our semantic memory tend to greater wisdom, we do indeed get wiser as we grow

older until a decent old age. Episodic long term memory (the red symbols) also starts to deteriorate in about our late 50s or early 60s, but does so much more rapidly. By the age of 85 its perhaps 20% worse than it was for most of our adult lives. Something to bear in mind with elderly witnesses.

Lessons Slide

92. So, in conclusion, what are the lessons from all of the science for us as advocates, litigators and judges?
93. I've mentioned quite a number as I've gone along. There are three other thoughts I would leave you with.
94. First, we must recognise the large number of ways in which recollection can become corrupted in a way of which the witness is unaware. The science reinforces my belief that most evidence, where mistaken, is nevertheless honestly given.
95. Secondly, we must recognise that some knowledge of the science is an essential part of our toolkit in the job we are doing. We don't allow expert evidence on credibility, so we have to treat this science as part of our training and a necessary part of our professional expertise. I have only touched on some aspects, and if you are interested in going further than the brief outline I have given this evening, and I suggest you should be, I will put up at the end a slide with a personal selection of bibliography which you might find of further interest and assistance.
96. What this means for the advocate is that in cross-examination and submissions, the angle of attack, in respect of most witnesses, is more likely to be successful if it seeks to undermine the evidence by reference to the various sources of innocent memory error, rather than a blunt and simplistic attack on truthfulness. Understanding the science and its consequences should help identify which aspects of the factors which lead to false memory are potentially in play, although that will of course differ from witness to witness and case to case.

97. Third, some of the judicial pronouncements on this topic may require reconsideration, particularly in relation to the extent to which contemporaneous documents and inherent probabilities are treated as assuming almost exclusive primacy over recollections.
98. Leggatt J said in *Gestmin* that: “The best approach for a judge to adopt in the trial of a commercial case is, in my view, to place little if any reliance at all on witnesses' recollections of what was said in meetings and conversations, and to base factual findings on inferences drawn from the documentary evidence and known or probable facts.”
99. That is a theme which has been repeated since by many judges. I would not myself wholly agree with it, based on the science.

Conclusion

100. I would finish where I started, by emphasising that generally human memory is remarkably accurate and recollection is a very valuable tool in determining what happened and why it happened. A 2019 paper by Professor Brewin and another published in the *Criminal Law Review* argues convincingly that the pendulum may have swung too far in the direction of dismissing memory as a useful and reliable tool in court.

Further reading/viewing

Legal Aspects of Memory Baddeley, Brewin and others, 16 June 2023 Journal of the British Academy, 11:95 -97.

The making keeping and losing of memory Ferrier Prize Lecture 2023 by Professor Richard Morris, 20 April 2023, available on the Royal Society's You Tube channel of past events.

Memory Baddeley, Eysenck and Anderson, third edition (2020) published by Routledge.

Memory accused: research on memory error and its relevance for the courtroom Brewin & Andrews (2019) 9 Criminal Law Review, 748 -763

Witness testimony: Psychological, Investigative and Evidential Perspectives (2006), edited by Heaton - Armstrong and others, OUP.

Gorillas in our midst: sustained inattention blindness for dynamic events Simons & Chabris, Perception 28 (1999) 1059 -1074.